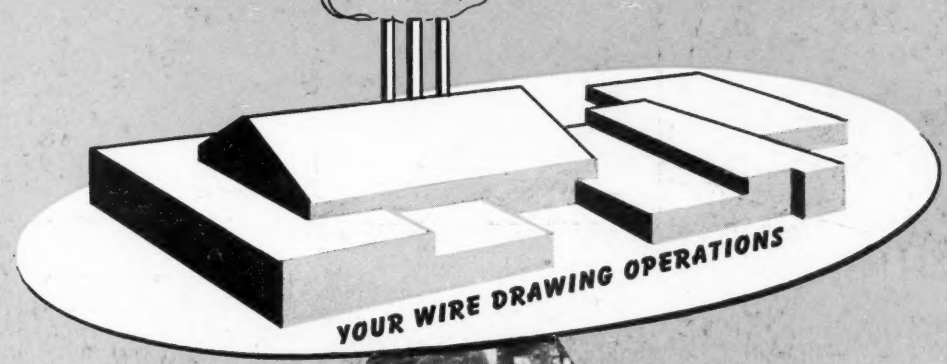
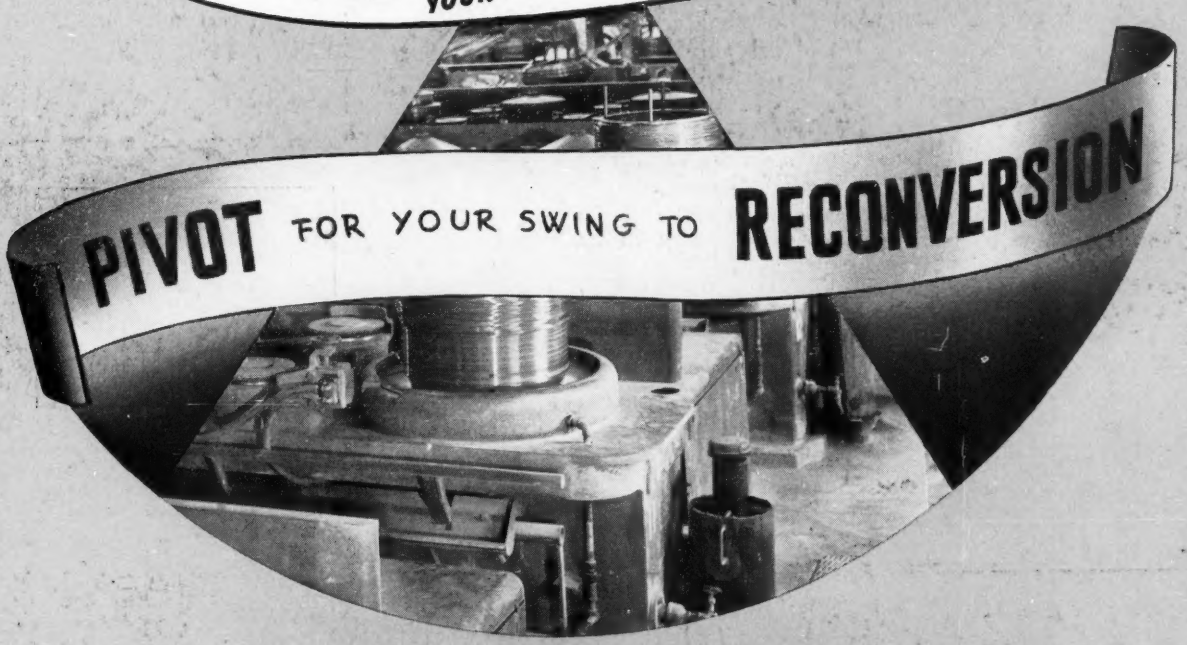
WIRE AND WIRE PRODUCTS

JULY 1944



PIVOT FOR YOUR SWING TO RECONVERSION



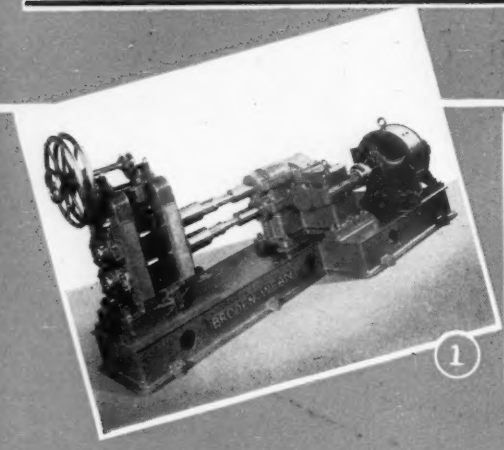
VAUGHN

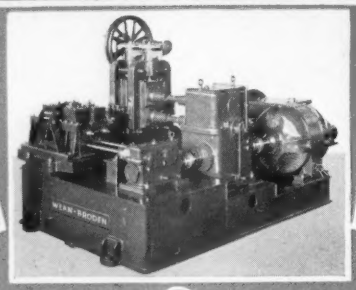
Wire Drawing Machinery

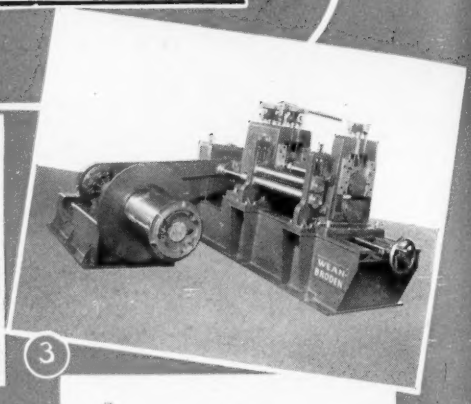
THE VAUGHN MACHINERY COMPANY
CUYAHOGA FALLS, OHIO, U. S. A.
COMPLETE COLD DRAWING EQUIPMENT

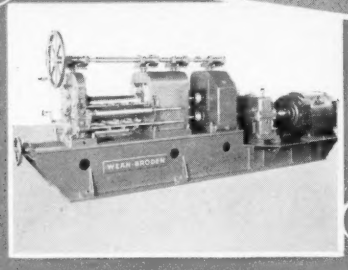
OFFICIAL PUBLICATION OF THE WIRE ASSOCIATION

WEAN-BRODEN









1. Small Cold Rolling Strip Mill
2. Special Strip Cold Rolling Mill
3. Strip Reel and Slitting Unit
4. Heavy Duty Slitter
5. Special Alloy Single Draft Heavy Duty Vertical Wire Drawing Block for ⅝" Round Rod

THE Wean Engineering Company, Inc., have long been recognized as Specialists in sheet, strip and tin mill equipment. . . . The Broden Construction Company specializes in the manufacture of narrow strip and wire mill equipment.

With the extended facilities of The Broden Construction Company as a subsidiary of The Wean Engineering Company, Inc., it is now possible to serve the steel industry more effectively.

COLD ROLLING MACHINERY

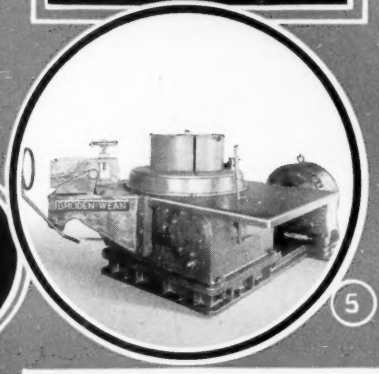
For 36" Wide Material and Narrower

Mills • Reels • Slitters • Levelers • Coilers • Edgers
Scale Breakers • Shears • Scrap Ballers
Continuous Pickling

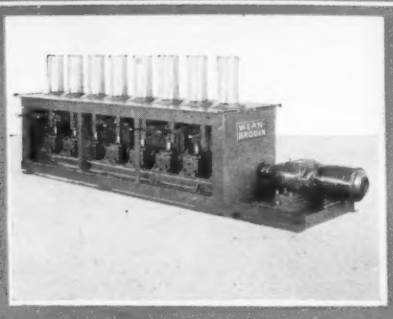
WIRE MILL EQUIPMENT

Wire Drawing Machines • Patenting • Galvanizing and Tinning Take-Up Frames • Wire Flattening • Spoolers
Nail Galvanizing and Blueing

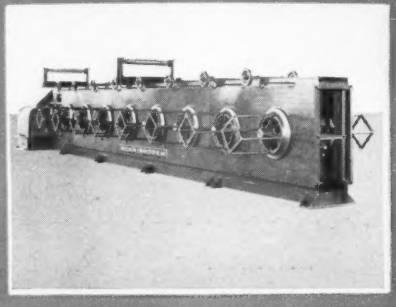
HOLMQUIST BARBED WIRE *and* WIRE FENCE MACHINERY



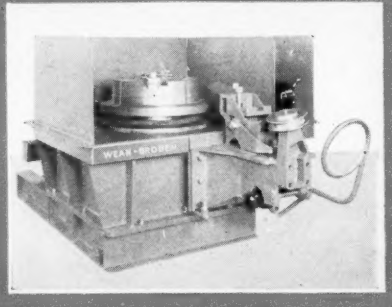
The BRODEN CONSTRUCTION Co., Inc., Cleveland, O.
A SUBSIDIARY COMPANY OF
The WEAN ENGINEERING Co., Inc., Warren, O.



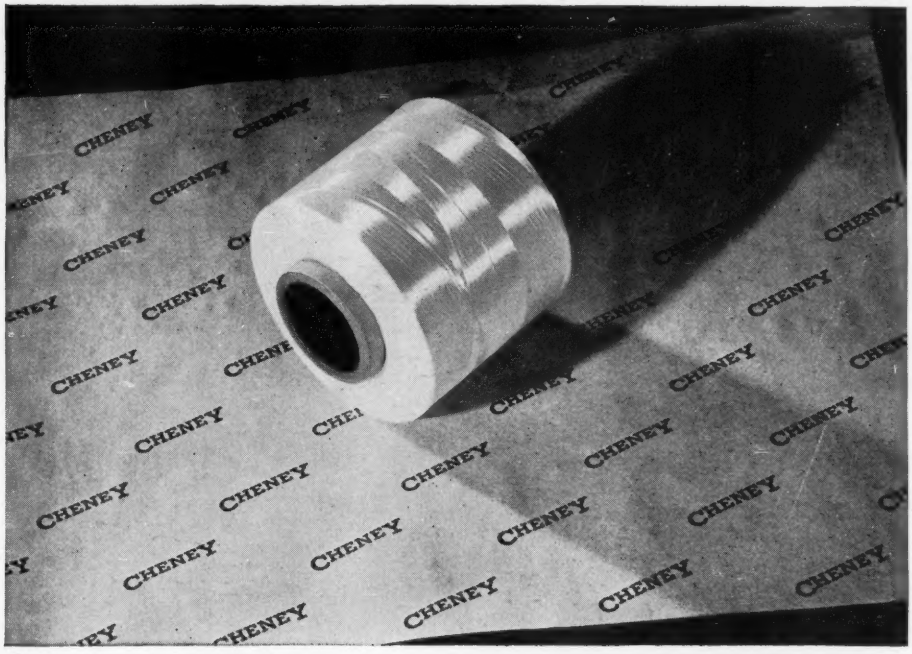
FINE WIRE TINNING UNIT



MULTIPLE WIRE TAKEUP FRAME



TWO DRAFT CONTINUOUS WIRE DRAWING MACHINE



For Today's Wiring...

Improved Yarns by Cheney Brothers

THE NEW METHODS and new machinery developed by Cheney Brothers have resulted in definitely superior new insulating yarns. For these methods eliminate static electricity; do away with loose filaments; and enable these fine, strong yarns to be precision wound for today's precision-made wiring.

Thus the accumulated knowledge and skill of a century's textile experience is turned to new uses. Now, of course, Cheney facilities are concentrated on meeting urgent military needs. But even now Cheney Brothers are looking ahead to the period after the war, planning new products and services for American homes and industry. Some of these—like the yarns mentioned here—are already in use. Others are being perfected for that peacetime world we all look forward to. Meantime, to bring a better peace sooner, there's one plan we all can follow. That is to buy—and keep on buying—War Bonds!

★ CHENEY YARNS

CHENEY BROTHERS

Manufacturers of fabrics of exceptional quality since 1838

Velvets—Pile Fabrics—Upholstery and Decorative Textiles—Cravats
Men's Wear Fabrics—Yarns for Industry—Industrial Textiles

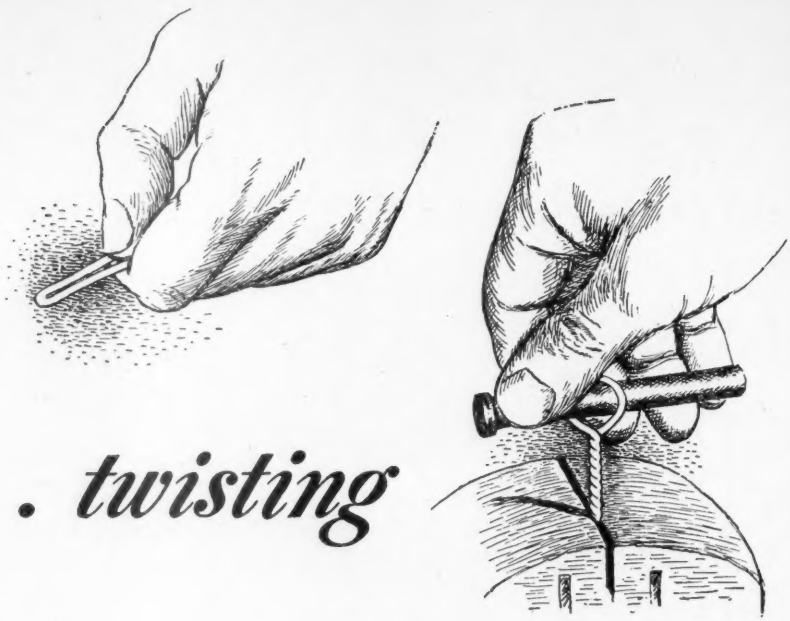
Sales Offices

NEW YORK • BOSTON • PHILADELPHIA • CHICAGO • LOS ANGELES

Mills at Manchester, Conn.

ALSO AT MANCHESTER, CONNECTICUT, A SUBSIDIARY...PIONEER PARACHUTE COMPANY

Bending . . . twisting



faze a BETHANIZED *coating?*

Never!

Bethanized wire can be twisted into any conceivable shape . . . bent back flat upon itself . . . even drawn to very fine gage . . . without the slightest injury to the zinc coating.

Bethanized wire owes its remarkable ability to withstand severe fabrication to the ductility of the bethanized coating. The coating is so ductile, so tightly locked to the steel by the advanced electrolytic process by which it is applied, that for all practical purposes it is virtually *a part of the wire.*

The bethanized coating is 99.9+ per cent pure zinc. This, and the fact that the coating is uniform, both around and along the wire, over every part of its surface, makes bethanized wire highly resistant to corrosion. And still greater protection against corrosion can be obtained by using extra-heavy coatings. Where conditions warrant, a bethanized coating can be applied twice or even three times as heavy as specifications call for in conventional Type 3 galvanizing.

Today bethanized wire is serving on world-wide battlefronts and on the production front at home . . . providing extra strength for field telephone wire, armoring under-water communication cables, making possible longer-lasting zinc-coated cotter pins . . . performing many other essential tasks.

Because of its unusual combination of properties, bethanized wire has many times been assigned to war-related applications in which it had never before been considered zinc-coated wire could be used with success. A multitude of new post-war uses for bethanized wire may be foreseen.

BETHANIZED WIRE

★ ★ BETHLEHEM STEEL ★ ★

One of a series of articles on the preparation of metal surfaces for protective finishes

INFORMATION ON SPECIFIC CLASSES OF PICKLING

Wire Pickling

From safety pins and bobby pins to the coiled springs in the easy chairs and the mighty steel cables that sustain suspension bridges — all wire must withstand the stress of bending, coiling and twisting as well as tensile strain.

Not only must the correct analysis for the metal be chosen but the treatment in reducing it to its proper size and form must not impair the quality. The transformation from the steel bar to the tough, slender wire requires expert knowledge and handling.

Pickling of wire, while an important step, is an old practice, and as such, often fails to receive proper consideration. Pickling should be done in such a manner that the metal will not be injured. In other words, the acid bath should be made to confine its action to its ascribed purpose, the removal of scale and rust, and be prevented from unduly dissolving and etching the clean metal.

Though the saving in acid and metal, which Rodine makes possible, is a factor responsible for its so general use, there are, however, other factors that at times are of even greater importance. Rodine, in markedly reducing the hydrogen evolved on the metal, logically reduces the amount that can be absorbed into the crystalline structure. It is the absorbed hydrogen that causes the embrittlement of steel wire, bars, springs, etc. It is this absorbed hydrogen that expands in the laminations and faults in sheets giving rise to blisters. Both of these conditions are minimized with Rodine through control of the acid's action.

In the wire industry, use of new Rodine has so reduced the embrittling effect as to make possible merely drying lime coatings in a flash baker in a few minutes instead of baking for many hours in the old-type baker.

Sheet and Strip Steel

In the steel industry, millions of tons of sheets and strip are pickled annually. The savings in acid and metal, due to Rodine control of the acid bath, on these large tonnages are huge. Savings in acid and metal are, however, not the only economies that Rodine effects. The savings due to minimizing the scrapping of blistered sheets and reducing the rejections of sheets or strips due to excessively pitted surfaces, with the resultant increase in tin or spelter required to fill pits in the surface, are important though frequently overlooked.

Pickling Alloy and High Carbon Steel—Stainless Steel

Alloy and high carbon steels are difficult to pickle. They are attacked rapidly by the acid and, as a result, the surface is roughened and blackened. This violent attack is due largely to the dissimilarity of contacting crystals in the alloys which in the pickling bath form electrolytic couples that in turn set up countless electric currents. These augment the acid's attack on the less noble crystals, thereby preferentially dissolving them and cause the metal to be rough and usually deeply pitted. To offset these characteristics of alloy and high carbon steels, it is of utmost importance to use Rodine. The addition of rock salt to the sulphuric acid pickling bath will lead to better pickled surfaces of alloy steels.

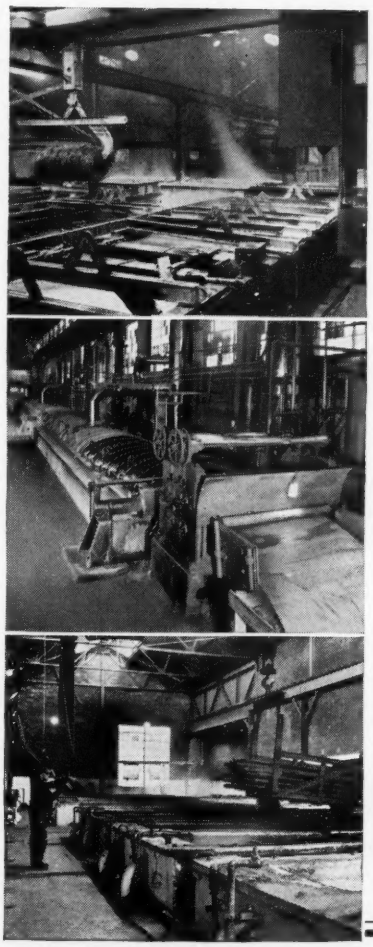
Pickling Machined and Polished Steel

Rust or oxidization from heat treating can be pickled from machined or polished steel without marring the high finish, when Rodine is employed. Even polished and threaded objects may be pickled in a Rodine inhibited bath without damaging threads or changing the dimensions of the work.

Pickling to Remove Metal Coatings

In pickling to remove metal coatings, such as zinc, from defective galvanized steel, Rodine prevents the acid from attacking the basis metal without retarding the stripping action.

RODINE *prevents*



Needless Waste

WHEN PICKLING WIRE, SHEET STEEL, STEEL TUBES OR STEEL PRODUCTS IN THE PROCESS OF FABRICATION

Briefly stated below are a few advantages from the use of RODINE.

- Clean metal is not wasted in pickling.
- Acid is not wasted in dissolving good metal.
- Smoother, brighter, cleaner surfaces are produced.
- Undue etching of the surface of threaded, machined or polished steel is avoided.
- Over-pickling is eliminated.
- Blistering of sheets is reduced.
- Acid brittleness is minimized.
- Uniform pickling is obtained under varying conditions.
- Zinc can be stripped without injuring the basis metal.
- The atmosphere is not contaminated with noxious corrosive gases.

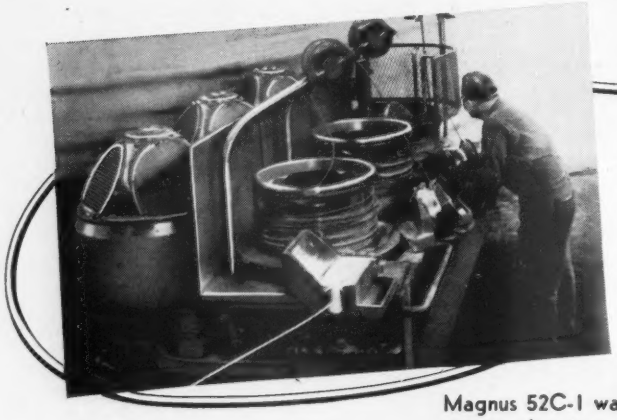
There is a type of RODINE for every pickling problem, depending upon the kind and strength of acid used, upon the nature of the steel, and upon the scale or incrustation to be removed. ACP engineers will gladly recommend the proper RODINE for your particular problem.

Manufacturers of Inhibitors & Metal Working Chemicals

AMERICAN CHEMICAL PAINT CO.
AMBLER ACP PENNA.

Note: West Coast Plants may address inquiries and orders for prompt delivery to Leon Finch, Ltd., 728 East 59th St., Los Angeles, Calif.

Good thru the Last Pass



Magnus 52-C-1 for High Carbon Wire

Magnus 52C-1 was developed for drawing steel rope wire of 80 to 85 point carbon in seven passes, starting at .079 with 83% reduction. After heat treating, the wire is again drawn seven passes starting at .033 with a 90% reduction.

Lubricants formerly used would not carry through for more than six passes, even at the low speed of 500 feet per minute. Magnus 52C-1 gives 700 feet per minute, with perfect carry through. It is equally effective on the second draw.

Since being successfully used on this type of wire, 52C-1 has been used with equal success on many other difficult draws where high speed and effective carry through on multi-pass draws are essential. It is used either straight in the die box, or mixed with lime up to 50% lime content, depending on the draw.

You'll find it worth while to look into the possibilities of Magnus 52C-1 on your dry drawing operations, whether on high carbon steel, or stainless and other alloy wires.

Do You Need a "Tailor-Made" Drawing Lubricant?

Your particular drawing operations may include one or more where no item in the regular Magnus line will exactly meet your requirements. We are anxious to work with you to develop a compound which will give you the precise results your operations demand. Just give us the data and an outline of your difficulties and let us get to work.

GET YOUR COPY OF THIS BULLETIN

Which covers the Magnus line of Drawing Lubricants. You'll probably find a more effective lubricant for your wet, dry or grease drawing operations described in this bulletin.

MAGNUS CHEMICAL COMPANY
188 SOUTH AVENUE GARWOOD, N. J.
Representatives in Principal Cities

Magnus WIRE DRAWING COMPOUNDS

CONTINENTAL WIRE MADE TO SPECIAL SHAPES

CONTINENTAL produces wire in many special shapes to fit manufacturer's requirements. Wire of special shape may add greatly to the appearance or quality of a product. Continental wire may be drawn to an intricate shape to fit into a special assembly or it may be drawn to a special shape to be used as a decorative molding.

Continental wire made to special shapes is available in a great variety of sizes and finishes. It has cut costs for many manufacturers. Even buyers of moderate size lots have realized substantial savings. You are invited to write or wire your requirements today.

CONTINENTAL STEEL CORPORATION • KOKOMO, INDIANA

CONTINENTAL
STEEL CORPORATION

PRODUCERS OF— SHEETS: Black, Galvanized, Copperior, Hot and Cold Rolled, Special Coated, Long Terne, etc.
WIRE: Bright Basic, Annealed, KONIK, Coppered, Tinned, Special Manufacturer's, etc.

NEW "Standard" CABLE SWAGER

with
AUTOMATIC DIE OPENER
and
AUTOMATIC FEED

"Standard" Cable Swaging Machine showing cable guide, die opening lever, foot pedal for feed control and hand adjustment for change of fitting sizes.

ATTACHES FITTINGS TO CABLE 10 TO 15 TIMES FASTER

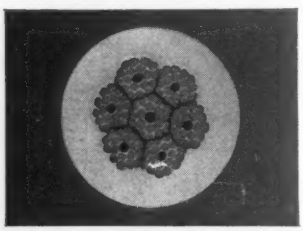
THAN FORMER MODEL OF "STANDARD" CABLE SWAGER

"Standard's" redesigned Cable Swager provides the same swaging action as used so successfully in regular "Standard" Cable Swagers and, in addition, with its automatic equipment, eliminates the extra operator formerly required, as well as the need for removing dies after each cable swaging operation.

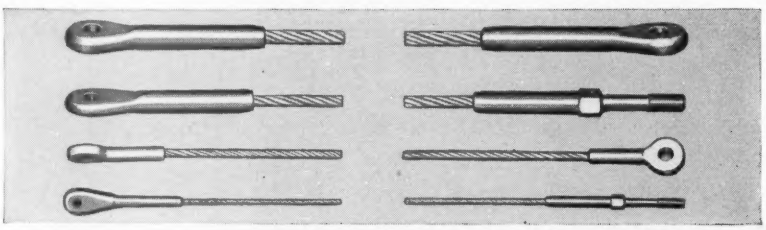
Fittings have a smooth surface and are swaged so firmly to exact dimensions on the cable, that fitting and cable strands appear to be fused. This connection exceeds the tensile limitations of the cable itself.

Four sizes of "STANDARD" Cable Swaging Machines are offered to handle cable sizes from 1/16" to 1-1/2". Fitting designs are not a factor as machines are provided with hand adjustment to handle specific types and sizes and to bring attachments to the required dimensions. In operation this new machine is safe, simple and amazingly productive. Only three seconds are required for each complete operation.

Write for special folder on "Standard" Cable Swagers.

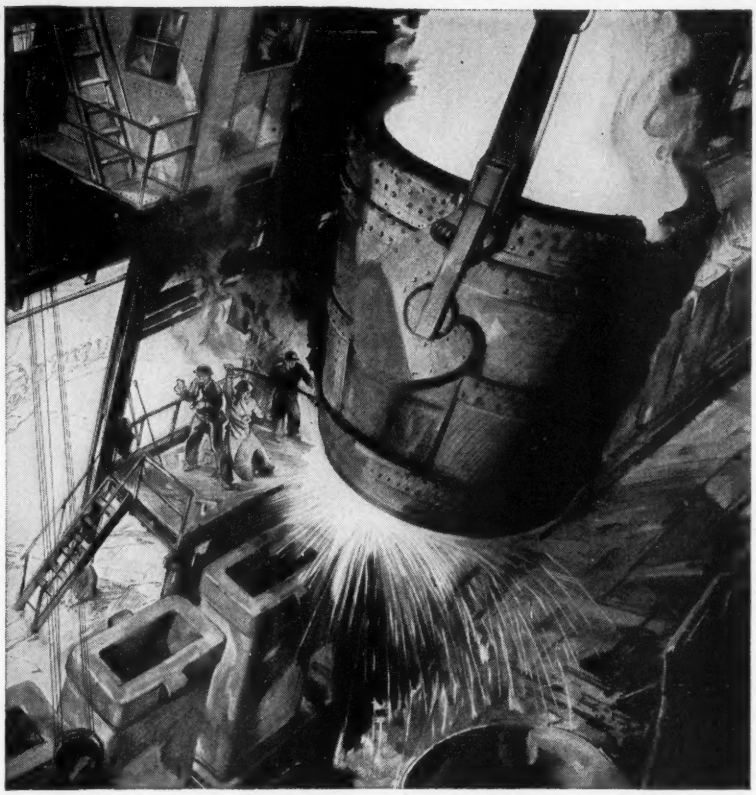


Cross section showing flow of shank metal around strands without distorting cable.



Examples of shank-type fittings as swaged on cable.

STANDARD MACHINERY CO., Providence 7, Rhode Island



TEEMING THE MIGHTY STEEL INGOT

Steel takes its first solid form with the teeming or pouring of the ingot, an operation in which skill and experience contribute to the control of quality.

The ingot is the measure of steel production. Its teeming is the culmination of the mining of iron ore and coal, the quarrying of limestone, the production of iron in blast furnaces and the making of molten steel in open hearths and converters.

Vast quantities of raw materials are consumed and immense equipment and the labor and skill of hundreds of thousands of American workers are engaged in the processes leading up to production of the mighty steel ingot — ninety million tons of which were produced in this country last year.

Steel from these millions of tons of ingots now moves forward to invasion, arming our fighting men, affording them maximum protection as they achieve victory. And with the peace to come, new steels will serve us in new and better ways.

JONES & LAUGHLIN STEEL CORPORATION
PITTSBURGH, PENNSYLVANIA

J&L STEEL

CONTROLLED QUALITY STEEL FOR WAR

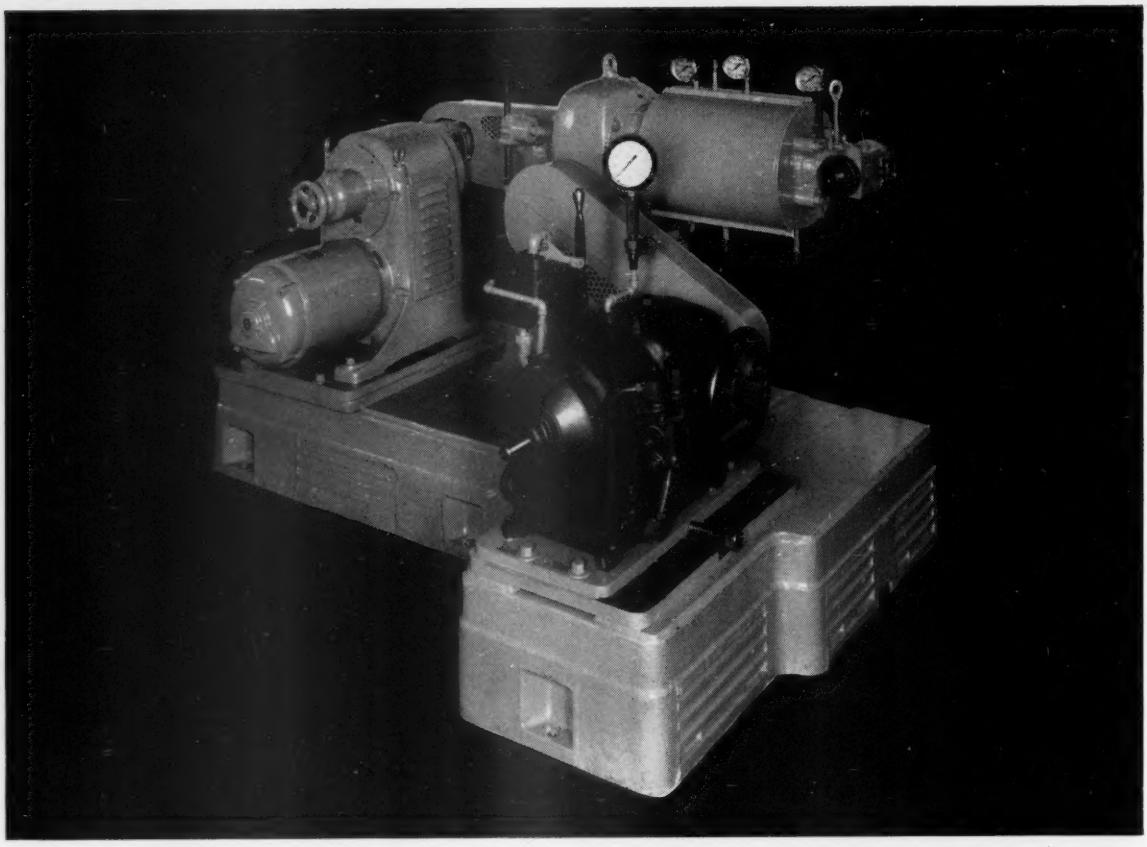
J&L STEEL RECORDS

Three world records for the production of steel and more than two thousand of its own production records (total of 2,018) were broken by Jones & Laughlin Steel Corporation works in 1942, 1943 and 4 months of 1944. "These 2,018 records since Pearl Harbor," President H. E. Lewis said, "made possible by the many thousands of men and women of J&L working in close cooperation with management, in mines, quarries, transportation lines, furnaces, mills and plants, are indeed an achievement in which all may take gratification for a job well done, and be inspired to do even better in the critical days of invasion." The records Mr. Lewis pointed out, included daily, weekly, monthly and yearly records, with 882 new highs at Pittsburgh Works, 791 at Aliquippa Works, 300 at Otis Works, Cleveland, and 45 at McKeesport, Pa., (a special ordnance plant). During this record-making period, J&L operated, and is still operating, above 100% of rated capacity.

U. S. Maritime Commission has awarded the Pittsburgh Works of Jones & Laughlin Steel Corporation its Gold Star to be added to the "M" Pennant presented last September, in recognition of continued production achievement. In congratulating the company, Admiral H. L. Vickery, Maritime Commissioner, said: "As our fighting forces press forward the advance on Berlin and Tokyo, it is my sincere hope that your company will continue to maintain or better its production record until victory is achieved." The Pittsburgh Works and the Aliquippa Works of J&L have both won the Army-Navy "E" flag with star for excellence in War production.

Fiery rivers of steel for war continuously pour out of open hearth and electric furnaces and Bessemer converters in the steel works of America into heavy cast iron ingot molds, tall as a man. The molds may be square, round, rectangular or truncated, according to ultimate shape the steel is to take in rolling and finishing mills. Each mold may have capacity for 5, 10, 12 or even 15 tons of molten steel. As easily as you would handle a bucket of water, metal crane operators adroitly swing great, thimble-shaped ladles full of tons of molten steel over the row of waiting ingot molds on low cars ("buggies") into which the steel will be teemed.

On the "teeming" platform (see illustration) the skilled steel pourer, nozzle setter, capper and metallurgical inspector move into action. First the nozzle in bottom of great ladle is cleared out, a sharp rod is pushed in, stopper handle is raised and steel bursts out in a bright stream that runs gurgling into the mold. When mold is filled, the steel pourer shuts off the fiery stream and signals craneman (upper left in illustration) to move to next mold, which he does with skill to prevent splashing. This goes on until the ladle is empty. From 10 to 40 ingots are thus teemed, depending upon sizes of molds and ladle.



MORE VITAL THAN EVER...

As our armies drive deeper into enemy territory the need for communications — adequate communications — becomes more vital than ever. Recently Major General H. C. Ingles, chief signal officer, U. S. Army

> "Communications has developed into one of the foremost military tools. I know of no other single activity which is so much a part of all military activity."

Today Royle Continuous Resin Insulating Machines are delivering plastics insulated wire in many of the nation's wire processing plants.

JOHN ROYLE & SONS

ROYLE — PATERSON N. J.

PIONEER BUILDERS OF EXTRUSION MACHINES SINCE 1880

PATERSON 3, NEW JERSEY

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JAMES DAY (MACHINERY) LTD.
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TRY · · TEST · · PROVE

THIS is the time, when labor is at a high premium, to *try* the lubricant which will give you the steadiest production with fewer interruptions.

Test in your plant and *prove* to your own satisfaction that your tough jobs can be solved by STANDARD, and that on any type of metal drawing, any speed, any finish, STANDARD lubricants will give you the best die life with the least rejection.

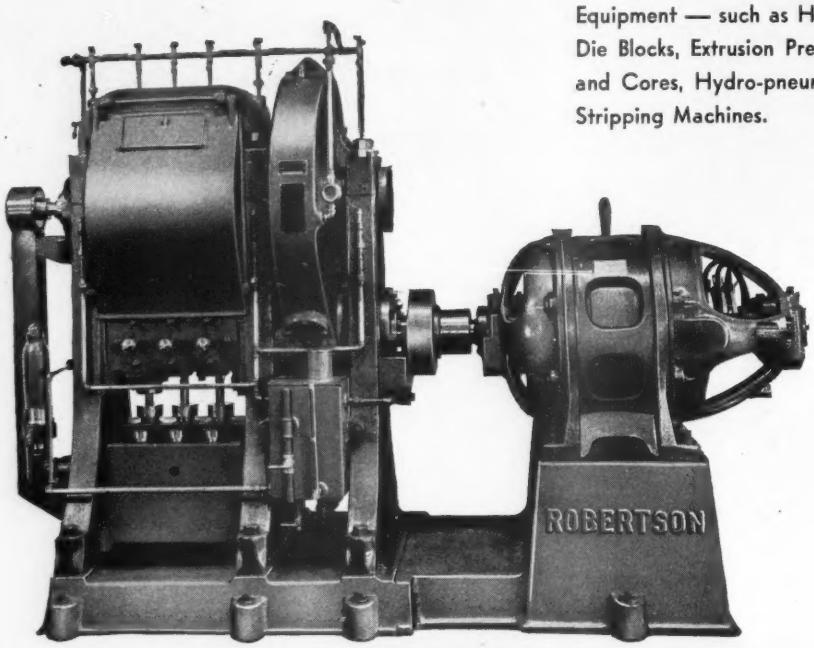
A note to us will afford you the services of our experienced engineers, while conducting a test run. We offer our services on lubrication, and prior to drawing, on the neutralization and coating.

√ *Replace* THE OLD AND ANTIQUATED *with* THE NEW AND IMPROVED

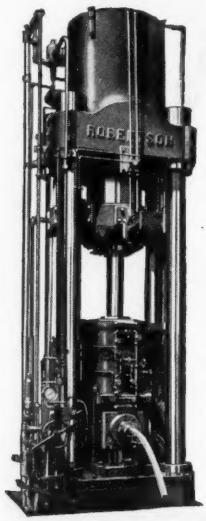
STANDARD INDUSTRIAL COMPOUNDS CO.
4600 W. Ferdinand St. • Chicago 44, Ill.

Reliable ROBERTSON

We make Lead Hose and Cable Encasing Machinery and allied Equipment — such as High Pressure Hydraulic Pumps, Special Die Blocks, Extrusion Presses, Melting Furnaces and Pots, Dies and Cores, Hydro-pneumatic Accumulators, and Lead Sheath Stripping Machines.

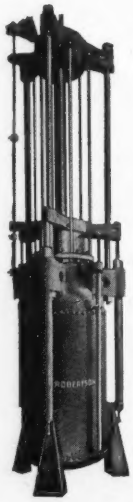


The new number 50 High-Pressure Hydraulic Pump —

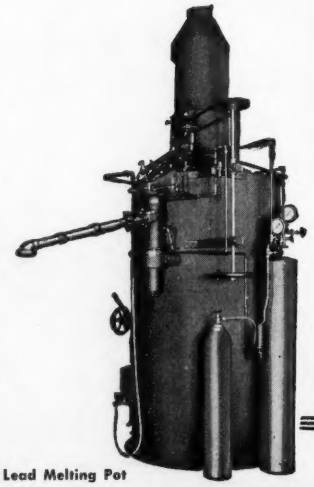


Cable Lead-Encasing Press

Robertson Equipment is based on the experience of more than three quarters of a century in building hydraulic machinery. Refinement in design with rugged durability keeps maintenance costs so low and operating efficiency so high that Robertson Machines are really less expensive in the long run.



Hydro-Pneumatic Accumulator



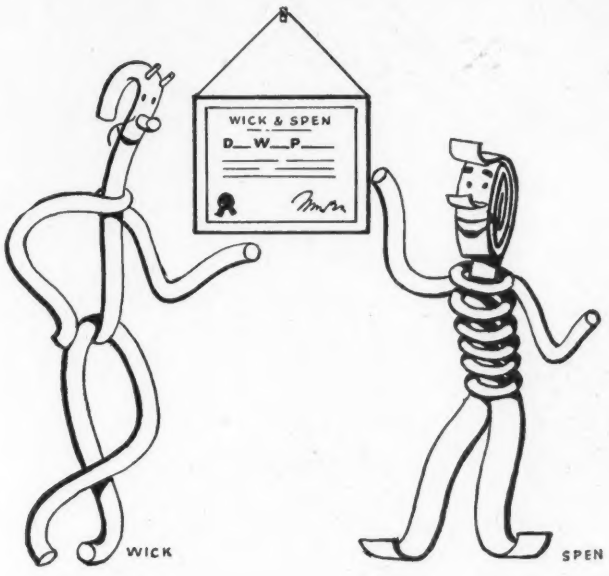
Closed Lead Melting Pot

JOHN Robertson COMPANY INCORPORATED

125-135 WATER STREET, BROOKLYN 1, NEW YORK

Designers and Builders of all Types of Lead Encasing Machinery

Since 1858



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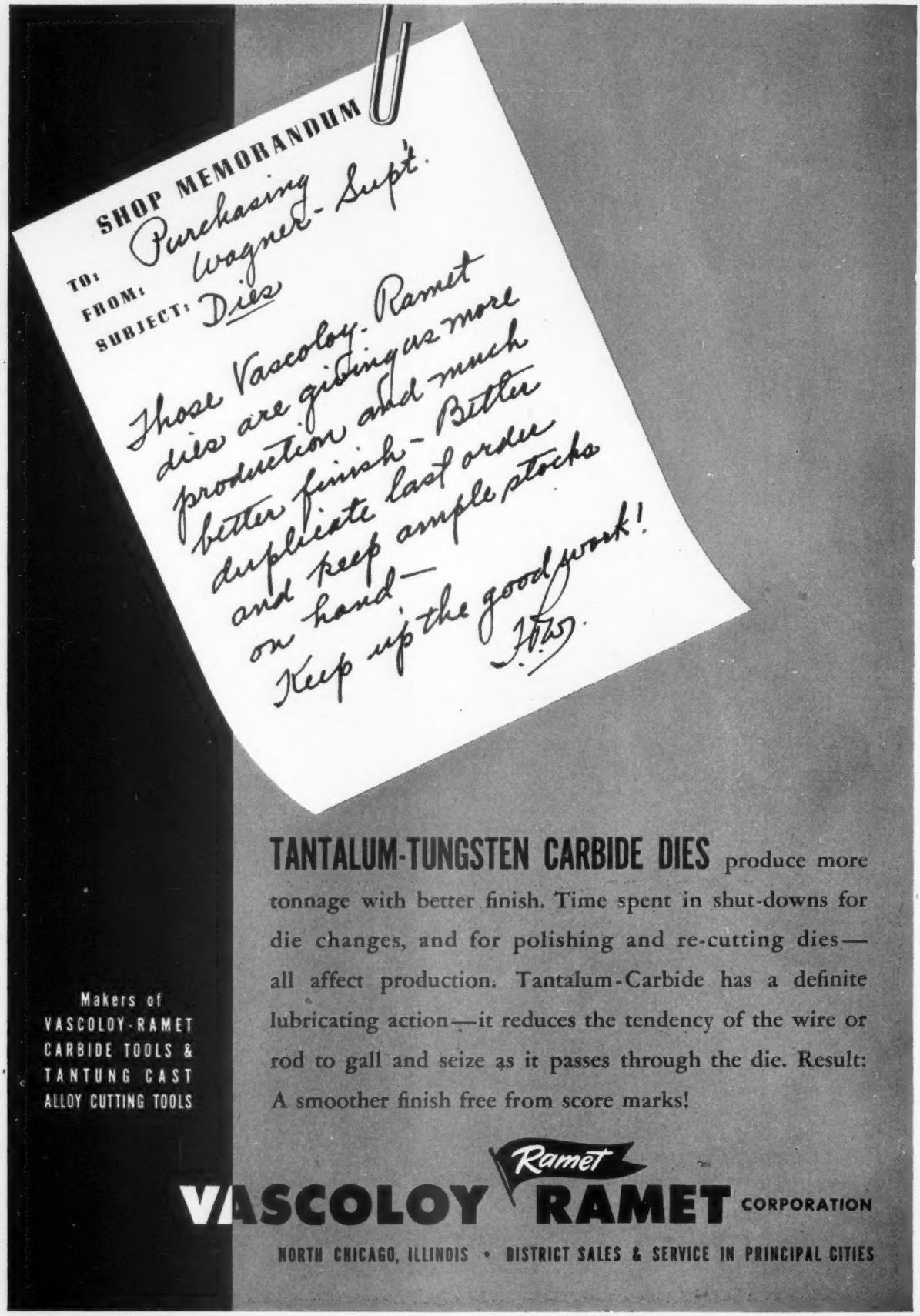
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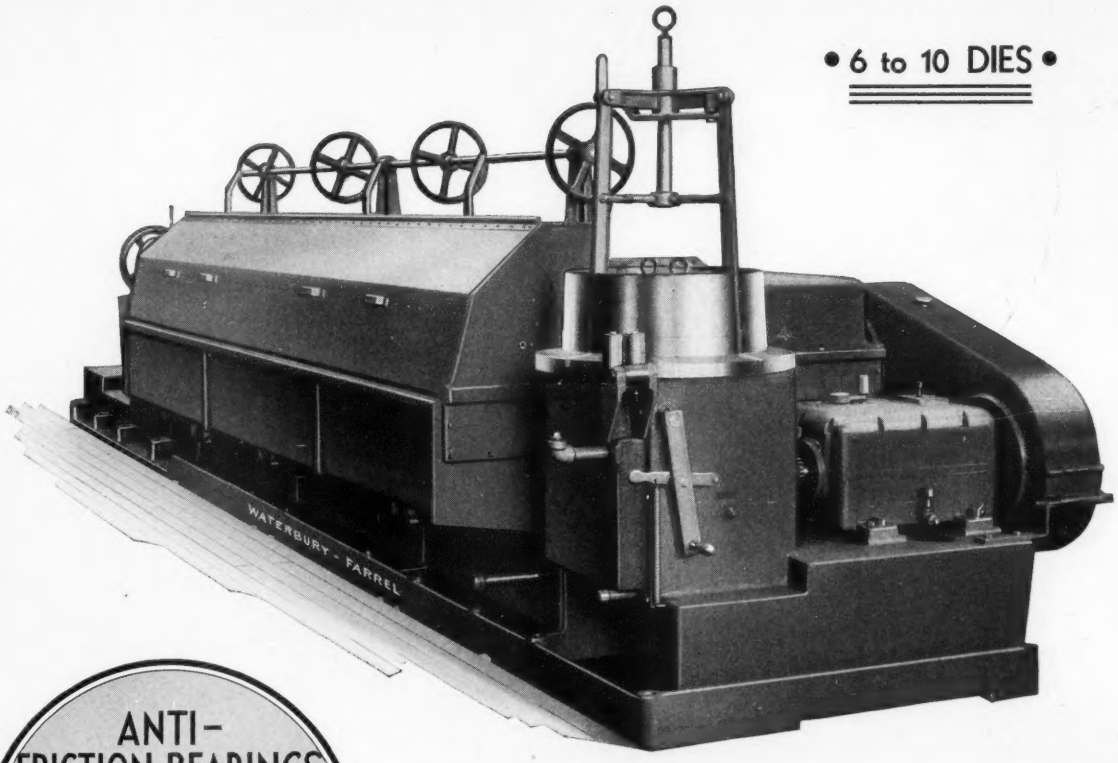

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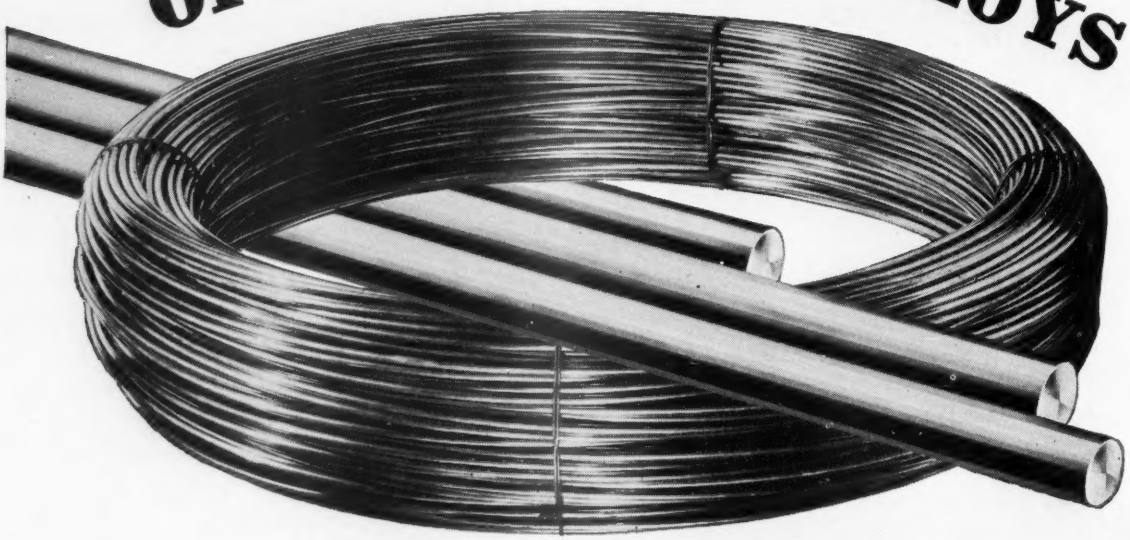

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WIRE AND WIRE PRODUCTS

A monthly publication devoted to the production of Wire, Rod and Strip, Wire and Rod Products and Insulated Wire and Cable

DRAWING — ROLLING — EXTRUDING — FORMING — FABRICATING

Vol. 19 JULY, 1944 No. 7

Designated as

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Contents

Coating Compounds: Their Capabilities and Functions ..... By John H. Richards, Jr. 415

Electric Equipment for Wire Drawing Machines, Part I ..... By A. L. Thurman 420

A Discussion of Some of The Factors That Affect Welding in Ship Building ..... By R. O. Waldman 426

Bethlehem Develops Special Tool For Making Dead Ends 430

Los Angeles Meeting of The Wire Association 441

Government Wire Production Information 433

Outstanding Personalities of The Wire Industry 436

A Review of Recent Wire Patents 438

Index to Advertisers 456

Where to Buy 457-460

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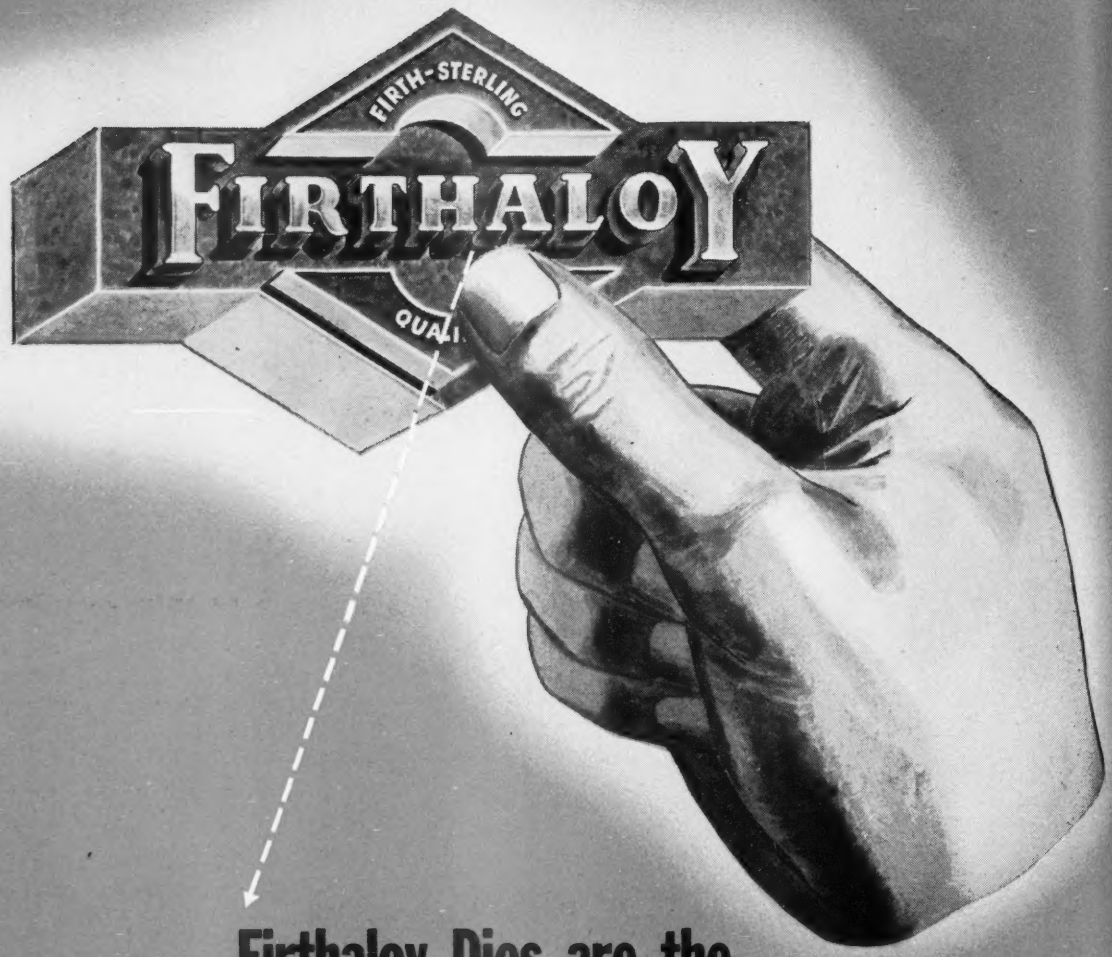

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Wire Products and Insulated Wire and Cable.
DRAWING --- ROLLING --- EXTRUDING --- FORMING --- FABRICATING

Vol. 19 JULY, 1944 No. 7

Coating Compounds--Their Capabilities and Functions

By John H. Richards, Jr.,
Chemical Engineer, Director of Research,
Apex Alkali Products Company.

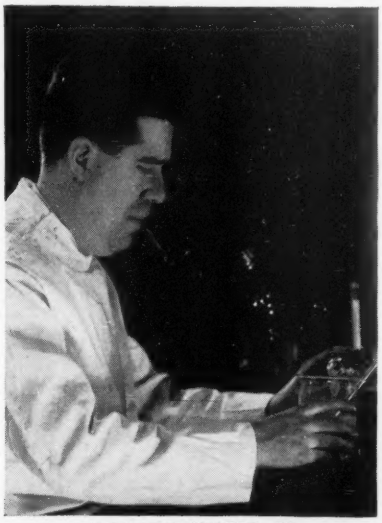
In which is set forth a resume of some typical performances of coating compounds in wire mill practice today, and a discussion of their functions, on both ferrous and alloy wires.

✦ ✦ ✦ ✦ ✦ ✦

IN a brief paper presented by the present author some twenty months ago it was tacitly admitted at that time that coating compounds, as then formulated, had been successfully applied only to the ferrous wires, but the hope was then expressed, and the prediction then made, that within the near future the more difficultly-drawable alloy wires would be successfully subjected to coating compound treatment. This is precisely what **has** happened and today we find a great many alloy wires being drawn more efficiently and economically through the use of some type of coating compound.

✦ ✦ ✦

BEING in complete agreement with sage Socrates, who stipulated that, "If you would discuss with me, you must first define your terms", we shall immediately proceed to define and hence describe a coating compound. By a coating compound, in the commonly accepted sense of the word, is meant a uniformly well balanced and completely homogenous blend of several ingredients (usually powdered in form) which, for ease of application, shall be completely and instantly soluble in either hot or cold water. This compound shall be applied by either spraying on the wire coil or coils, or dipping the entire coil or coils into the coating compound solution. This wire-coating operation is easily installed in any cleaning house set-up, the only equipment necessary being an additional metal (preferred) or wooden tub, and heated by either open or closed (preferred) steam coils.



JOHN H. RICHARDS, JR.
B.S. in Chemical Engineering from Bucknell University in 1933. Member Alpha Chi Sigma Nation Chemical Fraternity; Franklin Institute, Wire Association, American Chemical Society. Now Director of Research for Apex Alkali Products Company, Philadelphia, Pa.

✦ ✦ ✦

THE functions of an efficient coating compound are several, among which we may list the following more important:

1. **THE coating compound acts in itself as a lubricant and also as a base carrying-agent for whatever lubricant, either wet or dry, which may be applied to the wire for subsequent drawing.**

✦ ✦ ✦

2. **THE coating compound, in the case of ferrous wires, can successfully replace the lengthy and, hence, costly sul-coating operation yet employed in many mills. A Philadelphia Wire Mill, specializing in the drawing and production of high-carbon shapes for lock-washer stock, formerly consumed as high as sixty minutes (with a working average of forty-five minutes) of very valuable time in building up a sul-coat upon the wire. Their method of intermittently water spraying the coils while subjecting**

them to air-oxidation was supplanted by simply dipping them for a minute or so in a tub of the coating compound and then proceeding with the wire drawing operation. The time and expense of handling thus saved will go far toward reducing the final cost of a ton of finished rods.

✦ ✦ ✦

3. THE coating compound, in the case of ferrous wires, acts as an excellent rust-inhibitor and the film applied on the wire by the coating compound will completely prohibit the formation of rust for periods up to as long as three months in duration, by actual mill-practice test. One of the country's largest producers of rope wire commissioned a coating compound to prevent the rusting of coiled bundles of wire during storage. Storage conditions were deliberately made adverse. The coils were stacked in a shed, open on four sides, with merely a roof as partial protection against the elements. The three months testing period were the wet months of the year and yet no rust was apparent at the conclusion of this testing period.

✦ ✦ ✦

4. THE coating compound, which should, for utmost efficiency, contain an extremely active wetting agent, is thus better able to penetrate deeper into the pores of the metal than the actual pickling acid itself and hence, being alkaline in nature, this coating compound completely neutralizes any unrinsed pickle acid which may be imbedded in the pores of the wire itself, thus eliminating one of the contributing factors toward hydrogen embrittlement.

✦ ✦ ✦

5. THE coating compound also functions as an excellent cleansing agent for the more efficient and economical removal of all mineral oils, greases, surface dirt, etc. The necessity for clean wire can never be over-emphasized. "Wire that is properly cleaned is wire half-drawn."

✦ ✦ ✦

6. IN a great many cases in the ferrous wire field, the coating compound has been able to successfully replace completely the lime coating of wire, concerning whose several disadvantages we are all too familiar with.

✦ ✦ ✦

7. IN the case of certain of the stainless steel alloys the lengthy and costly procedure of lead coating has been eliminated entirely through the use of a coating compound in conjunction with lime.

✦ ✦ ✦

8. IN certain other cases on stainless steel wire the employment of a soft oxide coating and the coating compound has eliminated completely the necessity for employing the lead coating operation.
The following data represents a typical case in question where the coating compound in conjunction with an oxide coating entirely eliminated the lead coating procedure:

✦ ✦ ✦

Type of Wire:	18-8 Stainless Steel
Speed:	1000 ft./min.
Reduction:	75%. From .110 to .055
No. of Holes:	5
Drawn:	Dry
Results:	Upon examination there was found to be still sufficient coating on the wire to draw it an additional hole or two.

✦ ✦ ✦

THE quite logical question has been sometimes asked: "Well, now, if a coating compound is completely water soluble to begin with, how may this coating compound be possibly expected to remain intact on the wire if the wire is subsequently wet drawn, or if the wire, after it has been coated with the coating compound, is subsequently dipped into a lime bath, which consists, of course, of lime in suspension in, usually, a hot water solution." The answer to this question may perhaps be best explained by using as an example a rather recently developed product with which we are now all more or less familiar; namely, one of the numerous brands of cold water paints available everywhere today. These paints are immediately soluble in cold water for ease of mixing, and yet, containing a given percentage of alkali-treated casein, once this water soluble material has thoroughly dried it then becomes, not absolutely insoluble in water but, rather, very difficultly soluble. This is exactly what happens in the case of the coating compound. Although at first the coating compound is instantly soluble in either hot or cold water, after this thin tenacious film is once set up upon the wire it then becomes most difficultly soluble. This explains why the wire may be wet-drawn if the particular conditions require it, or why the wire may be then dipped in lime, if this is so desired, without actually dissolving the coating compound in the lime bath or in the wet-drawing lubricant.

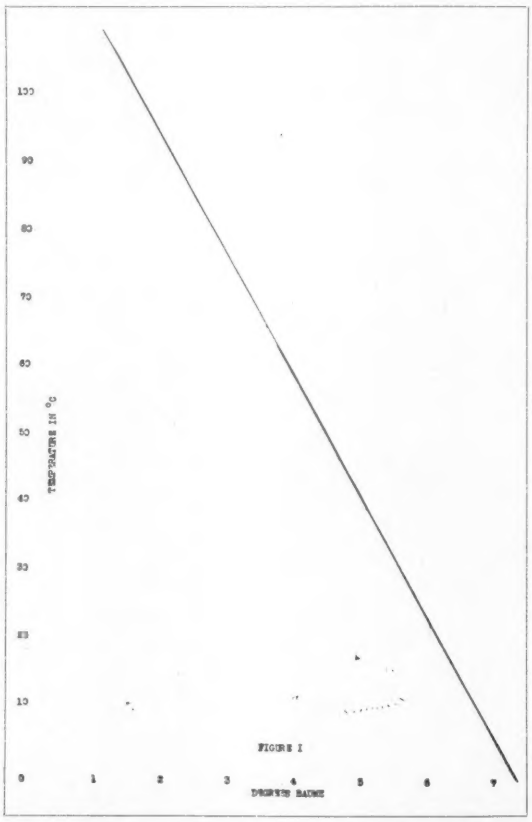


Fig. I. Graph showing straight line curve relationship between temperature and specific gravity, when concentration of coating compound solution is held constant.

✦ ✦ ✦

AT this juncture should be stressed the absolute importance of thoroughly drying-on the coating compound. Even a slight trace of moisture remaining in or on the coating compound itself has proven very injurious to the die when the moisture-containing spot comes into contact with the die-surface. An area not in excess of one square inch of moisture on the wire surface can, and usually does, cause instant wire breakage, so great is the sudden increase in the coefficiency of friction.

✦ ✦ ✦

QUITE possibly the greatest achievement to date of these versatile coating compounds, either

in place of, or in conjunction with lime-coating as is commonly practiced in the wire drawing field, has been registered in the fast-broadening field of stainless steel wire drawing. In a great many cases in this field we quite often find the rather time-consuming and more costly lead coating of stainless steel wire being eliminated (time-consuming not only to apply, but more so to remove); and for this lead coating is being substituted either the more economical soft oxide coating, in conjunction with lime and a coating compound, or, in specific instances, the oxide coating and the lead coating **both** have been eliminated and we find the lime and the coating compound taking over completely the function of preventing the dreaded metal-to-metal contact between the wire surface and the die. The saving, of course, in both time and materials makes this process instantly attractive to those whose processing layout makes its establishment possible. The following data is an actual experience in one of the East's largest producers of stainless steel wire:

✦ ✦ ✦

I —Type of Wire:	**Type 420 (35 Carbon—13 Chrome)**
Speed:	**600 ft./min (capacity of the machine)**
From:	**100 round to .058**
No. of Holes:	**3**
Drawn:	**Dry**
Machine:	**Vaughn Motoblox**
Dies:	**Carbide**
II—Type of Wire:	**Type 316 (3% Molybdenum)**
Speed:	**600 ft./min (capacity of the machine)**
From:	**100 round to .058**
No. of Holes:	**3**
Drawn:	**Dry**
Machine:	**Vaughn Motoblox**
Dies:	**Carbide**

✦ ✦ ✦

IN the former paper also was voiced the hope that in the near future lime in some cases might be completely eliminated and some coating compound substituted for the lime. Now, we are all too familiar with the several disadvantages of lime, and its total elimination has been a problem confronting the wire industry for a great many years. At the present writing the author has personally witnessed several successful attempts to eliminate lime in which 76 carbon wire was drawn at speeds as high as 650 feet per minute through eight holes on Morgan Benches. The wire was subsequently checked for tensile strength and torsion, as well as size, and the usual inspection tests and found to be quite up to par. What was two years ago merely wishful thinking is today actual reality and, in some mills, quite common practice. Another will is now running regularly on the following:

Type of Wire:	**Low carbon**
Speed:	**1500 ft./min.**
Reduction:	**From .080 to .0317 or 84%**
No. of Holes:	**6**
Drawn:	**Dry**
Tensile Strength:	**120,000**
Results:	**The heretofore necessary use of lime was completely eliminated, the finish on the wire being materially improved.**
Conclusion:	**Valuable time was saved through the elimination of the liming operation, in addition to the time saved by eliminating the oven-baking step.**

AN interesting additional application relative to the use of the type of coating compound described above has been the rather recent discovery that if the coils of wire be immersed in the coating compound solution (at boiling temperature) for a fifteen minute period the usual oven-baking operation for the prevention of hydrogen embrittlement is no longer essential. This statement is not made based simply upon a two or three weeks' test run, but rather upon results which have been carefully checked and verified over the past year. Actually, in this case the wire coils are boiled in the coating compound solution for a fifteen minutes period and then withdrawn into the air. The coating compound solution allowed to dry on the wire, and a hot air unit heater or ordinary mill fan will greatly hasten this drying) and the wire is then immersed in the hot lime tub, and the lime also dried in the air as above and the wire is then ready for the drawbench.

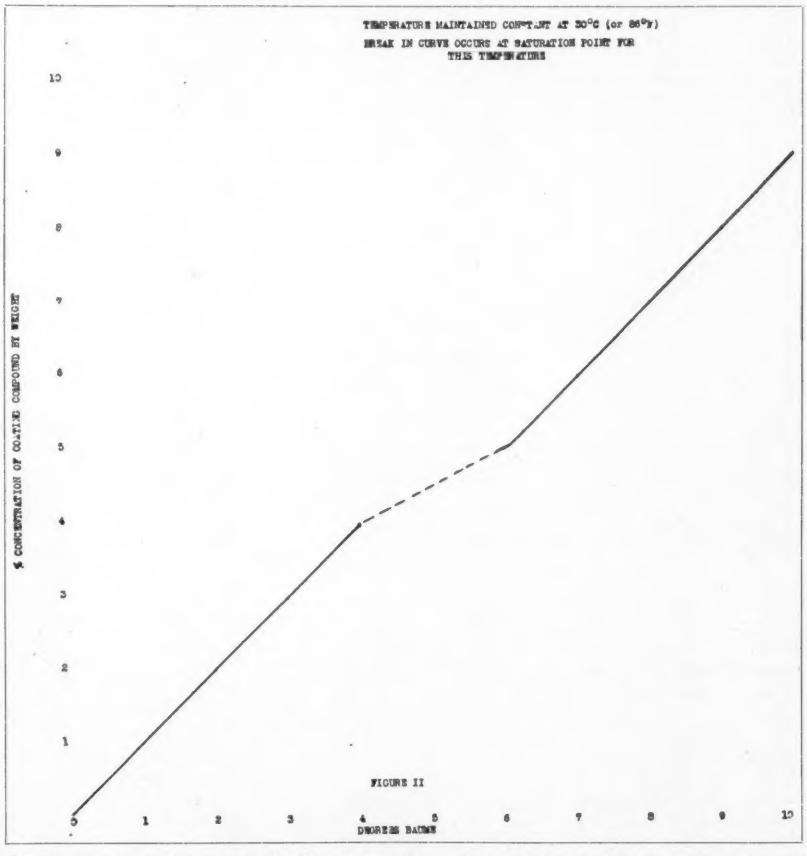

TEMPERATURE MAINTAINED CONSTANT AT 30°C (or 86°F)
BREAK IN CURVE OCCURS AT SATURATION POINT FOR THIS TEMPERATURE
% CONCENTRATION OF COATING COMPOUND BY WEIGHT
FIGURE II
DEGREES BAUME

Fig. II. Graph showing relationship between specific gravity and concentration of coating compound solution when temperature is held constant.

✦ ✦ ✦ ✦ ✦

AN inquiring mind might ask: "Well, now, if we have been able to put a tenacious and adherent film of coating compound on this wire with one dip into the solution, why can we not double the thickness, or triple the thickness, or quadruple the thickness with two, three, or four dips in the coating compound and, hence, double, triple, or quadruple the efficiency of the compound as a lubricant, or double, triple, or quadruple the amount of coating compound which would still be left upon the wire after it had been drawn a certain number of holes?" Rigid and exhaustive tests conducted by the author have proven this to be a fallacious assumption. A maximum coating thickness of .0004 inches in thickness seems to be the most dense film which we can expect to build up upon the wire, and this can always be accomplished in a single dip. Any material deposited on the wire in the form of a coating compound beyond this point simply tends to build up in the die, is hence pealed off, and not carried through on the wire surface. So that we come once more to another supporting hypothesis of the theory that, in the final analysis, it is only the last molecular layer of coating or lubricant on the wire between the wire and the die which actually takes the brunt of the load. Thus, any coating compound should be formulated with the principal idea in mind of, rather, stressing the **adherency** of the coating compound to the metal surface instead of attempting to increase the film thickness of coating compound which can be built up upon the wire.

✦ ✦ ✦

AT this particular point it might be well to point out the very distinct advantage (insofar as the final quality of the finished product is concerned) in the employment of a thin layer-film of coating compound rather than the several times thicker lime coat: All wire which has been carefully coated with a coating compound rather than lime must be absolutely free of scale and chemically clean inasmuch as any commercially available coating compound worthy of the name must not **only** coat, but also thoroughly clean the metal surface. Also, it is a very common truism that the liming of wire in any cleaning house cycle can cover a multitude of sins and omissions made by the cleaning house operators at any previous point in the cleaning cycle. This is certainly **not true** of a coating compound. If the wire is not chemically clean, and scale yet remains on the wire it is at once apparent through the extremely thin film of the coating compound and, in fact, the coating compound will not "take" nor the necessary film "set up", if traces of oil, dirt, or grease yet remain on the wire. This condition is at once apparent to the naked eye of even an inexperienced inspector.

✦ ✦ ✦

IN Figure "I" will be found a chart in which has been graphed the temperature of the coating compound solution as the abscissa against degrees Baume' read from an ordinary Hydrometer as ordinate. This easy-to-read chart enables the pickle house foreman to keep an accurate account of, and a quick check upon, the concentration and, hence, the efficiency of his coating compound solution at all times. This figure one chart is shown here simply in order to stress the important part which temperature plays in obtaining a Baume' reading of any aqueous solution. The actual check-chart for the coating compound solution will be found in Figure "II" in which is demonstrated the relation which exists between the concentration of the coating compound solution, if the temperature is held constant, and degrees Baume'.

✦ ✦ ✦

FOR possibly more accurate checks upon the solution strength of the coating compound tank, and where conditions permit, the following titration method is probably to be desired:

One-tenth normal Hydrochloric Acid is employed for titration and 5 CC's of the coating compound is mixed with 50 CC's of water and Phenolpthalein is the indicator.

The reading obtained on the Burette is then divided by .9 and this gives you a direct percentage reading and the coating compound concentration, which for mill practice is maintained between 4 and 5% by weight.

✦ ✦ ✦

THE author personally believes that for all practical purposes nothing approaches in either accuracy or ease of reading the universal-indicator strips which are now available in handy pocket size, complete with comparison color chart and container.

✦ ✦ ✦

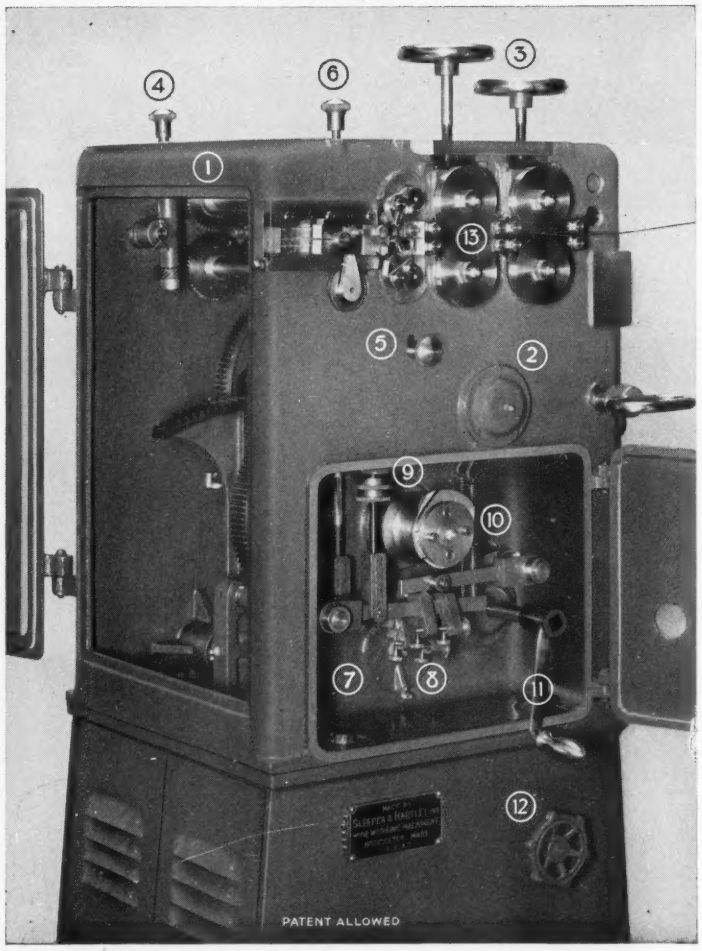
IN conclusion, it must in all fairness be stated that the coating compounds now available on the present day market are far from being the answer to everything desirable in such a commodity. Until that day arrives when wire may be coated in the cleaning house itself and then drawn without any further lubrication in the wire-drawing machine, or in the die-box, coating compounds will have a much-to-be-desired goal to strive for. The author sincerely believes that that day is coming and if the present excellent cooperation can continue to exist between those in the wire processing industry and those in the business of producing commodities for the drawing of wire, this goal will undoubtedly be attained. If one were to carefully consider the great improvements which have been made in coating compounds over the past three years it certainly is not too much to hope that comparable improvements can be made within the next three years. And, if such will be the case, there will probably be no practical limit to the number of holes which may be drawn with a coating compound, nor will the coating compound be limited to use only on certain types and sizes and shapes of wire, but rather the application of these coating compounds may well become just as universal as the acid in which these wires are now pickled. Also, there would be no reason to limit the speeds at which this wire may be drawn. The author also confidently expects to see coating compounds make it possible for wire in very fine sizes, particularly in the alloy wire field, to be drawn through carbide dies rather than the now universally used diamond dies.

(Please turn to Page 454)

13 Points of Superiority

in

No. 1 Universal Spring Coiler



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One piece solid cams can be used on this removable cam hub.

11- Removable ratchet-type crank for set-up purposes only. Removed during operation.

12- Motor or Pulley Drive as required with variable Speed Transmission for production range if desired.

13- Tooling interchangeable with previous Sleeper & Hartley models.

No. 1 Universal Spring Coiler

Segment Type

48" Model *Series 666*

Wire Range .018" to .080"

INCREASED CAPACITY

Compound gearing for 96" feed if desired.

Other Improved Features—

Morse Free Wheeling Clutch for high-speed accuracy. Morse Free Wheeling Recoil Clutch, as extra equipment, if desired.

Single cutter operation.

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Worcester, Massachusetts, U. S. A.

Electric Equipment For Wire Drawing Machines

By A. L. Thurman,
Industrial Engineering Division, General Electric Company,
Schenectady, N. Y.

PART I
Electric Equipment for Wire Drawing Machines
Published July 1944

PART II
Tensiometers on Wire Drawing Machines.
Build-up Reels — Electric Reel Drives — Thyratron Control.
Published August 1944

THOUSANDS of miles of wire are strung across the many American fighting fronts. Only the steady growth of the wire drawing industry, combined with improvements in the wire drawing art, have made it possible for the industry to supply this tremendous demand. Wire drawing equipment and processes have been continually improved by concentrated research and development.

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THE Army Signal Corps must have treated field telephone wire which will resist corrosion; wire which is strong and tough enough to withstand rough-and-tumble treatment in the field. Other vital components of our war machine also have exacting requirements for special types of wire. To meet these wartime demands, new treatments have been developed; machine improvements have been made; processes have been improved; and production methods have been streamlined.

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BECAUSE of the many wire products used in the manufacture of electric equipment, the electrical industry must work closely with the wire drawing industry. The electrical and metal-working industries have worked hand-in-hand in the development of new processes and in providing new and better drives and better machines. Electrolytic plating is coming into widespread use in the production of much of the special wire now used by our armed forces. Electrolytic cleaning and pickling show promise of broader application in the future. Even now these processes are considered essential in the production of certain special wire products.

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FOR electrolytic processing of wire products, the electrical industry has come forward with a broader application of dry-type rectifiers to provide a convenient, efficient, and easily controlled source of low voltage d-c power.

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IN providing electric equipment for the various types of wire drawing machines, the electrical industry has been alert to the needs of the wire drawing industry, and has thus been ready to furnish the type of drive which will best meet production requirements of all types of wire drawing machines.

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A COMMON type of wire drawing machine consists essentially of a die with means for applying lubricant to the rod before it enters the die, and a power driven drum which acts as a capstan (commonly called the block) to draw the wire through the die and often to provide storage for the drawn wire. Wire drawing machines are divided into three general groups: (1) the single block machine; (2) the multiple block machine with a single motor drive; and (3) the multiple block machine with a motor drive on each block.

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Single Block Machine

THE single block machine can be either a single or double-pass design. The single pass machine consists of a single stationary die and a motor driven block. The double pass machine has two dies, with the two blocks mounted one above the other, and driven from the same shaft. Wire passes through the first die and is given a few wraps around the first block; the free end is then brought through the second die and around the second block. The block diameters and die sizes are so arranged that there is a small amount of over-feeding from the first to the second block, where the coil is wrapped and stored in loose coil form. Some multiple block machines use the double-deck block arrangement for the first block on the machine.

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THE electric equipment for a single block wire drawing machine should be provided with the following features:

1) **Slow starting and smooth acceleration for minimizing wire breakage.**
2) **Rapid acceleration, smoothly controlled, for maximum production.**
3) **Adjustable drawing speed for maximum production of a given size of wire.**
4) **Low jogging speed in forward direction to facilitate threading of machine.**
5) **Low jogging speed in reverse direction to permit ease of stripping finished coil from block.**
6) **Braking to reset after jogging in either direction to facilitate spotting of block.**

7) **Rapid stopping to provide safety to operators and minimize time lost during deceleration.**
8) **Adequate safety devices for protection of operator.**

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ALTHOUGH different types of a-c drives have been used, the above characteristics can best be obtained by use of a d-c drive, either constant potential, adjustable speed or adjustable voltage, adjustable speed. Multi-speed squirrel cage induction motors can be used to provide different operating speeds, but smooth starting can not easily be provided. If only a very limited range of wire sizes is to be drawn and one drawing speed will be satisfactory, a reasonable compromise to the above characteristics can be obtained by use of a wound rotor induction motor. Slow joggling speeds are not always obtainable, especially under light or no load conditions, but if suitable control is furnished satisfactory operation can usually be obtained.

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WHERE constant potential d-c power is available, or where a large number of machines are to be installed, a d-c magnetic control will usually be used. Where only a limited number of machines are to be installed, or where a wide range of special products are to be drawn on one machine, adjustable voltage control should be used. In this case, straight adjustable voltage control, with standard motor-generator sets, is satisfactory; however, some operators have requested additional and special operating features which require either the use of amplidyne control or Thy-mo-trol (electronic motor control). A 40 HP Thy-mo-trol drive is now being built for a wire drawing machine. This drive will provide a wide operating speed range with smooth, controlled, current limit acceleration and deceleration. Thy-mo-trol drive provides a complete power and control unit with desirable operating features and will likely find increased application in the wire drawing industry.

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ON most single block machines constant potential d-c drives have been used. The operating requirements are met by the following means:

1) **Smooth starting and acceleration to a speed determined by the motor field rheostat setting, accomplished by:**
   - **A) A starting series field, shorted out by the final accelerating contactor, produces a high starting torque, permitting the motor to start the wire through the die without jerking. At operating speeds this field is shorted and is thus ineffective except that the transformer action of the shorted turns combines with the effect of the normal stabilizing field turns to provide very stable operation.**
   - **B) Two definitely timed points of shunted armature for low speed regulation during early stages of acceleration to assure starting speeds within comparatively narrow variations for wide load variations.**
   - **C) A suitable number (determined by hp rating of drive) of definitely timed points of series armature resistance acceleration for low accelerating torque peaks, thus providing comparatively smooth acceleration.**
   - **D) Current controlled acceleration from instant final accelerating contactor closes to time preset drawing speed is reached.**
   - **E) By proper adjustment of adjustable resistance and time steps, smooth acceleration is obtainable.**
2) **Drawing speeds will usually be adjustable through a 3/1 speed range by means of motor field rheostat.**
3) **Quick stopping by means of dynamic braking applied instantly upon indication from: A) "Stop" button, B) "Safety loop" or "snarl" limit switches, or C) Under load relay indicating wire breakage.**
4) **Wire breakage can sometimes be indicated by means of an underload relay. The underload relay is a double coil device, one coil being responsive to armature current, and one to motor field current, so that the relay tends to compensate for the increase in motor running light current as the speed of the drive increases. This type of relay has limitations, however, and should not be used unless the operators understand its shortcomings.**
5) **Jogging in either direction is provided at low shunted armature speed. Jogging in reverse is provided for releasing wire tension after stopping to strip the reel or for spotting the block. Dynamic braking is applied as soon as either jogging button is released.**
6) **Protection is provided for the motor by disconnecting it from the line and applying dynamic braking in case of: A) Overload, B) Excessive field weakening, C) Undervoltage.**

Multiple-Block Machine with Single Motor Drive

MULTIPLE block machines have two or more dies, with a drum following each die. These drums are called blocks, capstans, or reels, depending upon the manner in which they are used. The term "block" is applied to a drum which stores the drawn wire in the form of a loose coil. The block is usually mounted with its shaft vertical, its lower portion being of the larger diameter and a nearly cylindrical surface, tapering upward. Above the drum portion, the block consists of from four to six arms, which serve to support the loose coil. Wire coming from the die is wound on the tapered portion of the block at the point of maximum diameter, and successive wraps force the preceding one up the tapered portion and finally onto the skeleton portion of the block. The coil hangs loosely on the skeleton portion of the block and the driving force is transmitted to the wire by friction between the tight wrap at the bottom and the tapered portion of the block.

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Group Driven Blocks

THE various spindles on this type of machine are driven at fixed speeds, and the individual wire drawing blocks are engaged with these vertical spindles by means of jaw type clutches. Each block and its die forms a separate wire drawing unit. The start of a block of this type is therefore abrupt which means that drawing speeds and reductions are limited to the values which can be started without breaking the wire. Friction clutches have been used to ease the shock of the abrupt start, but maintenance cost of such a device is high. Because of the limitations of this type of machine, the multiple-pass continuous and semi-continuous machines have come into greater demand.

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Continuous Machines

ON some multi-pass machines the wire is brought through one die, given several wraps around

the drum and is then passed directly to the next die, and so on until the last block or reel is reached. The intermediate drums serve as capstans to supply the force for drawing the wire through each die. These machines are strictly continuous, in that the wire passes through each die at the same rate in pounds per minute. Since it is practically impossible to arrange the reduction in each die and the speed of each drum exactly to the correct values, machines of this type are laid out to have theoretical over-feeding; in other words, the speed of the first drum is relatively higher than that of the second drum, and so on. This causes a slippage of a few percent on all except the final drum, since the drum can only draw wire through the die preceding it.

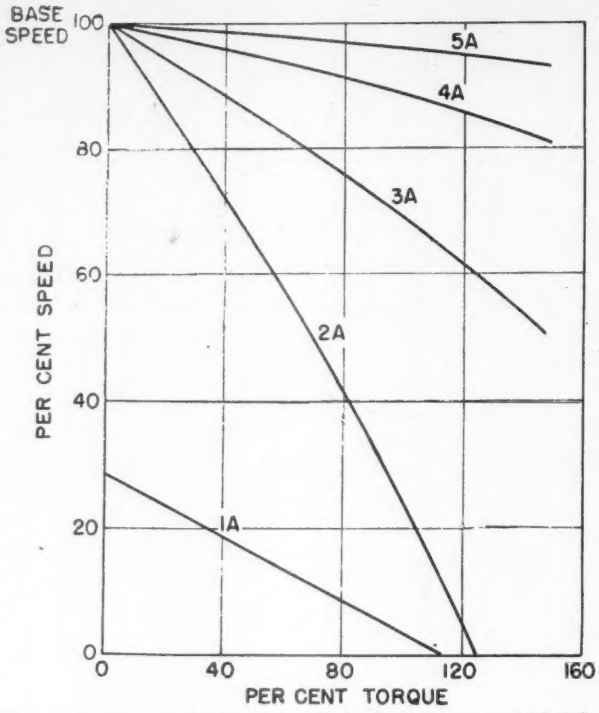

Fig. 1. Jogging and starting characteristics for constant potential D-C drive for wire drawing machine.

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MACHINES of this type may have the drums or capstans arranged either horizontally or vertically, and are known as the tandem continuous type. These machines are usually used on heavier wire and may be furnished in either the block type, which coils the wire, or the drum type which spools the wire.

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FOR drawing copper or lighter steel wire, the upright cone type continuous machine is commonly used. These machines may have as many as four drawing roll spindles, and as many as 16 dies. In this machine wire passes from one step of the cone through a die to the opposite spindle, always to a larger diameter, thus taking up the elongation of the wire by higher speed steps. Careful choice of die sizes is important, but a certain amount of slippage is always necessary to prevent wire breakage.

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Semi-Continuous Machines

ON the multi-die machine of the semi-continuous type, the intermediate drums are of the "block" type and provide wire storage between the dies. The end of the loose coil on one block is led down through the center of the block to the next die, and then on to the next block. These machines have a common drive for all blocks and are laid out for overfeeding between dies, the excess wire being stored on the intermediate blocks.

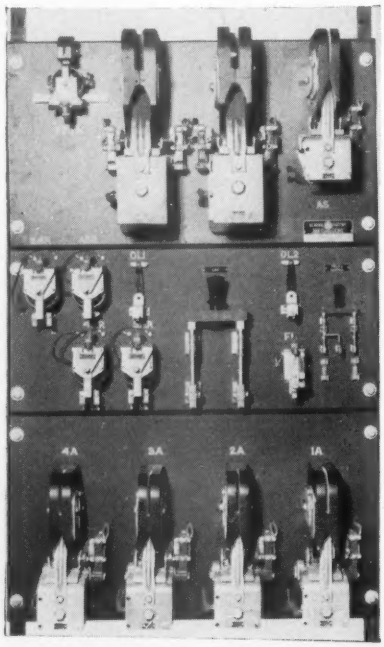

Fig. 2. Constant potential D-C control panel for adjustable speed D-C motor for wire drawing machine.

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THE jogging duty on the electric equipment for a machine of this type is severe, since during threading-up the motor is jogged to spot the first block, the gripper chain is attached to the wire, and the motor is jogged until several wraps are taken around the block; the pointed wire is then entered into the second die, the motor is jogged for spotting the second block, and so on.

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ON some machines, particularly those for drawing copper wire, the last drum is in the form of a reel, and the wire is fastened directly to the hub of the reel after it has passed through the last die. As the wire is wound on the reel, it builds up in layers, causing an increase in effective reel diameter throughout the drawing of a coil. For constant wire speed, this means that the speed of the reel in rpm must vary inversely as the effective diameter of the reel.

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WOUND rotor induction motors and adjustable speed direct current motors are commonly used to drive both continuous and semi-continuous machines. Squirrel-cage induction motors have been used but they are not suitable for this service because of the need for smooth starting and frequent jogging.

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THE requirements of electric equipment for a continuous or semi-continuous machine with single motor drive are similar to those for a single-block machine except that reverse operation is not usually required. Low jogging speed is essential to permit ease of threading; the jogging speed-torque curve should have a low

enough speed at light load to permit threading the first block and also enough torque to drive the machine while the last block is being threaded.

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ADJUSTABLE voltage d-c provides the ideal characteristics since voltage can be easily and quickly changed to provide ideal jogging speed for threading all blocks. Suitable operating characteristics can usually be obtained, however, by providing the proper control for a constant potential d-c drive. Typical jogging and starting characteristics for an adjustable speed d-c motor drive are shown by Figure 1. Assuming a 20 per cent load on each block for a 4-block machine, the threading speeds will be: Block #1-24%; #2-19%; #3-14%; #4-9%. Drawing speeds are usually made available through a 3:1 speed range. Figure 2 shows an open control panel for an adjustable speed d-c drive; the starting and dynamic braking resistors are separately mounted.

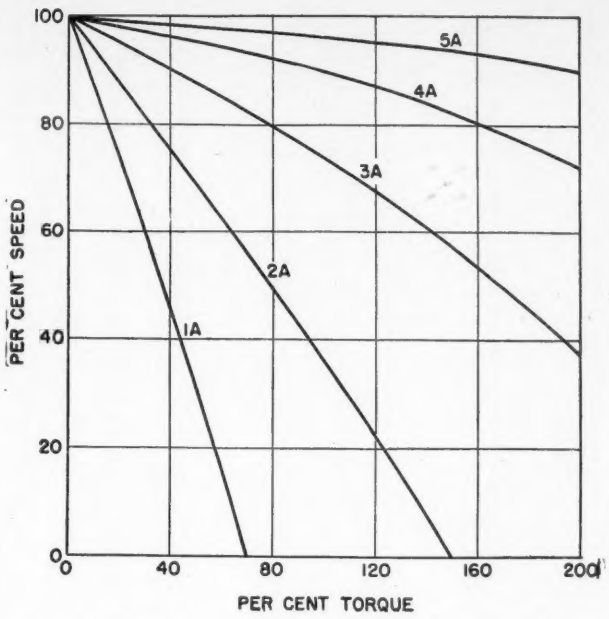

Fig. 3. Jogging and starting characteristics for A-C wound rotor induction motor drive for wire drawing machine. ✦ ✦ ✦

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IF constant speed drawing is suitable, a wound rotor induction motor can satisfactorily be used to drive a semi-continuous machine. Typical jogging and starting characteristics are shown by Figure 3. The 1A curve indicates that slow jogging speed is not available at light load, but in actual operation, the operator can obtain suitable jogging speeds by depressing the jogging bar only momentarily. Figure 4 shows an open control panel for a wound-rotor motor drive; the starting resistor for this control is also mounted separately.

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Multi-Block Continuous Machines with Individual Block Drives

THIS type of machine consists of several capstans, each located between a pair of dies, with a conventional block reel following the last die. Adjustable speed, direct current motors are used for driving each of the capstans and the reel; capstan and reel speeds can thus be varied in such a way that the wire can be drawn continuously without slippage. This is normally accomplished by use of a "dancer roll" rheostat operating on the field of each motor. As the wire leaves a capstan, it passes around the dancer roll and then back over a fixed or idling pulley into the next die. The dancer roll is connected to the field rheostat controlling the field of the motor immediately preceding it. Thus, in case the motor is running at too high a speed, causing the loop to grow, its field will be strengthened and the motor will be slowed down; if the loop tends to decrease, the motor will be speeded up. The motors for these machines can be driven either from constant potential d-c power or from an adjustable voltage motor-generator set for furnishing power to all capstans and the reel.

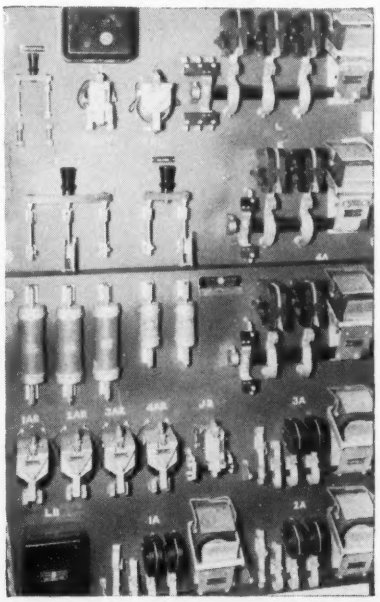

Fig. 4. Magnetic non-reversing dynamic-braking control panel for A-C wound rotor induction motor for wire drawing machine. ✦ ✦

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THIS machine is shown schematically by Fig. 5. The armature and field circuits for either adjustable voltage or constant potential control are shown. Vernier rheostats are shown for all motors, but when only a limited speed range by field control is available, they are not required.

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WHERE there is no d-c power available in the plant, adjustable voltage control will usually be used, unless a number of these machines are to be installed at one time. In addition to the smoother operating characteristics of this type of drive, wide speed ranges are possible and, for drawing lighter wire, overvoltage on the system can be used to provide higher operating speeds. With adjustable voltage control, both regenerative braking and dynamic braking can be provided, and much of the operating speed range is usually obtained by voltage change. This permits the use of higher base speed and therefore less expensive motors.

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FOR either type of control, reversing is shown for the last or reel motor to permit reversal of

the block for removing the coil. Reversing is not always provided, since some sizes of machines can be reversed readily by hand for unloading. If reversing is not provided, the dynamic braking resistor is removed when the drive comes to rest.

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ALTHOUGH all of the control features shown by Fig. 5 are not always provided, the separate line contactors on each motor permit separate jogging of each block. A less expensive equipment is usually furnished, however, since it is common practice to jog all motors simultaneously throughout the threading operation.

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THIS type of machine is provided with a foot operated "jogging bar" along the side of the machine near the base, and a "start-stop" shipper rod or safety bar along the machine at the proper level for hand operation.

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THE requirements of electric equipment for this type of machine are as follows:

1) **Speed of motors driving capstans automatically controlled as each successive die is strung.**
2) **Spotting of blocks should be provided by dynamic braking to rest after jogging.**
3) **Initial low starting speed should be available to permit the operator to run the machine at a low speed to assure that the wire is pulling smoothly through the machine before high speed operation is started.**
4) **Smoothly controlled, rapid acceleration for maximum production without wire breakage.**
5) **Quick stopping, to provide safety to operator, and minimum lost production time during deceleration. Proper speed relationship between motors must be maintained during deceleration to prevent wire breakage. To permit separate adjustment of braking for each motor, individual dynamic braking is provided. Because of the greater inertia of the last block, it is usually provided with two**

(Please turn to Page 454)

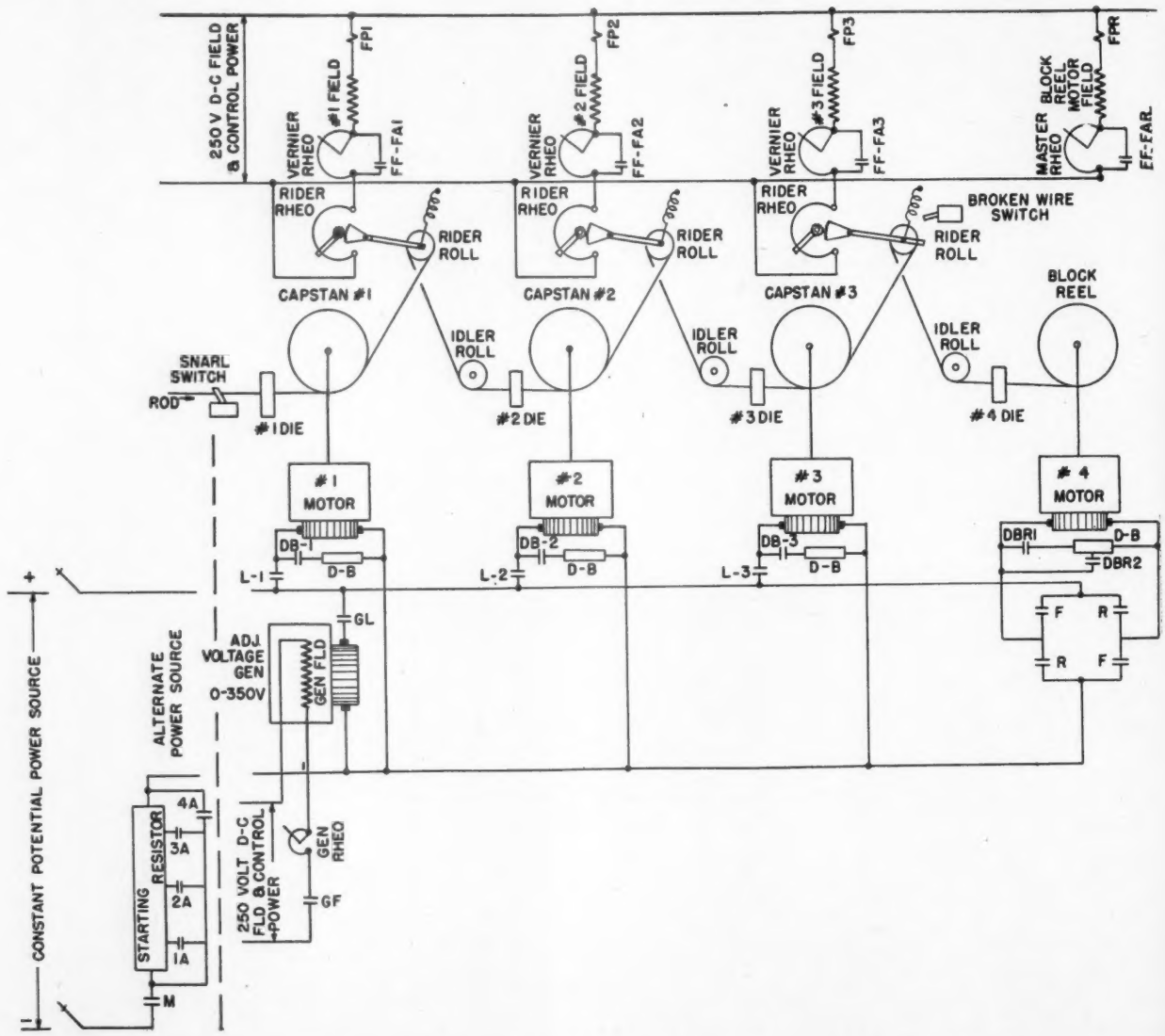

Fig. 5. Multi-block continuous wire drawing machine with individual block drives showing either D-C adjustable voltage or D-C constant potential power source.

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A Discussion of Some of the Factors That Affect Welding in Ship Building

By R. O. Waldman
Chicago Steel & Wire Co.,
San Francisco, Cal.

OUR War Production Program, involving the stupendous production of War and cargo ships, tanks, trucks, aircraft and other implements of war, both for ourselves as well as our Allies, has called for electric or arc welding on a scale heretofore never dreamed of, and might add, without welding, the rate of production that has been achieved, would not have been possible.

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IN addition to the thousands of men who were previously employed at welding, probably as many as 600,000 men and women have been trained and gone to work in War Production plants all over the country.

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CONTRARY to some loose talk on the part of newspaper writers, these men and women are not taken off the streets and put to work welding up ships with only superficial training, but they are given an intensive course of training in special schools, many of them operated by the ship yards, and only when they have shown proper progress and adaptability to the art of welding, are they permitted to take the test, which is conducted in the presence of, and under the supervision of a Government Inspector, who is anything but tolerant of poor workmanship, to say the least.

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THEN, if the student passes this test, which consists of welding up specially prepared steel plates, and the welding is done in flat, vertical and overheat positions, and if in the "pull, bend and break test" his or her plates show the high quality requirements, they are then put to work doing "tack welding" which means placing small, short welds in the seam of two plates, in order to hold them together, for the regular welders to completely weld.

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THEN they progress according to their proficiency, and each step must be approved, not only by the foreman, leaderman and welding supervisor, of the employer, but also by the Government Inspector, and they are by then capable of turning out work of the highest order, and while they have not acquired a knowledge of metallurgy, their work does not require it, as it is altogether repetitive, day after day.

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TO get some idea of the marvellous growth of welding, let us consider that five years ago, the use and consumption of electric welding rods in this country ran to around 70,000,000 pounds for that year, while for 1943, the consumption ran to considerably more than that **for every month**, or the colossal figures of over **1,000,000,000 pounds**, or between fourteen and fifteen times as much as in 1939!

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FOR this, the present day heavy coated electrodes or welding rods, are entirely responsible, as welds made with rods lacking these coatings would in no case be of sufficient strength, ductility, or corrosion resistant properties to permit their use in the building of ships and other war materials.

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THESE coatings, (they are distinctly different from ordinary flux coatings), are perforce, very similar in their properties, but they still differ from each other in their ingredients, as each manufacturer has developed his particular coating along the lines of theories espoused by their Engineering Departments, and this difference frequently is the cause of trouble in plants, when a new brand of rods is brought in, which, in tests made by their engineering departments or testing laboratories, showed all of the desirable properties in the highest degree, but when issued to the welders, fails to produce acceptable results.

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THE cause for this can be summed up in a few words: Lack of familiarity with the new rod, for while outwardly, different makes of welding rods may resemble each other closely, be the same color, etc., the formula under which the coating is produced, may and in practically all cases, does differ materially, and to such a degree that changes in the welding machine setting, the arc length, and/or other changes in the welder's technique may be required.

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ONE manufacturer perhaps favors a fairly high amperage setting and correspondingly low open circuit voltage, and his rods are designed for this type of welding current, while another, acting on the premise that lower amperage and relatively higher open circuit voltage produces more punch to the arc, produces rods that work best with such a machine setting. One will favor a long arc length, involving the risk of exposing the molten metal to contact with oxygen; another prefers the shorter arc, which might call for slightly more skill on the part of

the operator, and therefore any deviation from the required technique with either rod, will produce improper welds and nothing but criticism from the welder.

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THE easy answer to this is to say that all manufacturers should use the same formula, or at least formulas that will not require special techniques, but first of all, it has been found entirely impossible for anyone to completely copy another formula, as even the closest analyses do not disclose the exact proportion of each ingredient, even if this were desirable. Then would come the question "Whose formula is to be adopted?" and last but not least, this would serve to put a stop to all further research and development work, and we need only to consider the enormous strides in welding rod development in the past few years, to appreciate how important this development work is, and that it must be kept up at all costs.

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STEEL is probably the most valuable and useful element that man has put to his use, but for some unknown reason, it has been endowed with the property of being highly susceptible to strains and stresses, and we know that any deformation of steel, even as simple an operation as bending it at right angles, sets up measurable stresses and strains, not of a critical nature, except possibly in the case of hardened steels and some of the critical alloys.

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IT is gratifying to know that within a short time, (the exact period is not known) such stress relieve themselves, much like a stiffened and sore muscle that limbers up with use.

IN welding, and particularly in arc welding, because of the instantaneous melting of the steel, and the consequent quick cooling, these strains and stresses are a factor that must be reckoned with, especially in a highly complex structure such as a large cargo ship, with its myriad of structural members, beams, stiffeners, shell and deck plating, etc., etc.

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THERE have been a few cases of fractures and even serious failures in welded ships, but the percentage, compared to the thousands of ships that have helped to provide the 20,000,000 tons of shipping annually that we require, has been infinitesimal, though each case of such trouble has received nation-wide publicity, the newspapers playing them up on the basis that if we build a thousand ships by means of welding and on which no trouble occurs, that, except in trade and statistical journals, is not news; but let a crack develop in a ship that was built in the mild winter climate of the Pacific Coast States, and then on its first trip out, is sent up through the Arctic Circle and encounters 60 below zero, and the resultant contraction caused by this change, produces a crack in a piece of shell plating, which might even be of sub-standard quality, then the press play it up as front page news, and the lay public is lead to believe that **welding is unsafe,** or worse still, that, quote: "Proper welding practice was sacrificed in the interest of high speed production" unquote.

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THE stresses and strains set up by welding, evidently follow certain lines and they tend to become cumulative, but they do not leave a discernible trail behind them. Their course can definitely be controlled and kept from focalizing, through the welding sequence and procedure that is employed, and the Navy Department, Maritime Commission and other authoritative agencies have worked out proper sequences for almost every type of structure or ship, and the foremost naval architects, designers and engineers of the country are engaged in research work that will provide the proper answers to the problems that still confront the welding industry in the few somewhat minor phases, and we can be assured that in the very near future even those ship yards that have been reluctant to adopt 100% welding, will enthusiastically embrace it as the modern and better way of building ships, bridges and buildings.

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BY every test, Electric Welding has been found superior to riveting, in shipbuilding, pressure vessels and every type of structure on which it has been employed, and we need only recall that in the early part of this war, riveted tanks were found to be veritable death traps, as the enemy's rapid-fire guns' projectiles, often drove the rivets in on the operators of the tanks, and welding then took the place of rivets on all this work, as well as armor plate on Navy ships.

✦ ✦ ✦

WELDING is stronger, better, faster and more economical than any other method of joining metals, and full credit for this development must be given to the present day heavy coated electric welding rods — and their designers, who labor on incessantly, unsung, and except in the welding industry — unhonored!

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DIE FINISHING AND SERVICING EQUIPMENT

FOR ALL YOUR CARBIDE DIE NEEDS

Regional Service Shops

To speed deliveries of new dies and insure prompt servicing when required, completely equipped service shops are operated at Chicago, Detroit, Pittsburgh, and Thomaston, Connecticut.

Plus **TRAINING "SCHOOL" FOR YOUR MEN**

Available without charge, to the personnel of your die room, is a complete training course, conducted at our Detroit Plant, covering detailed training in the finishing and servicing of all types of Carboloy Dies and Mandrels. Under personal supervision of a die specialist with more than 20 years of die room experience. Descriptive booklet on request.

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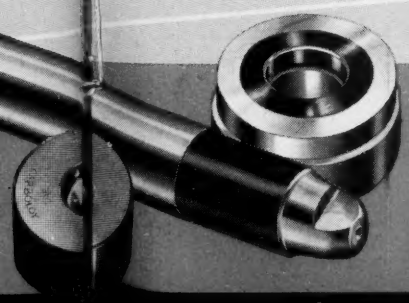

CARBOLOY

TRADE MARK

CEMENTED CARBIDES

Bethlehem Develops Special Tool For Making Dead Ends

AN interesting technique for making dead ends with bethanized strand has been made possible by the introduction of a special tool recently devised by the Research and Development Department of **Bethlehem Steel Company.** While the tool was originally designed for use with the familiar breakdown serve, for which it is excellently suited, later work has resulted in an improved procedure which may be termed the "dead end wire" or "serving coil" method. As the latter expression indicates, it involves the use of a small coil of dead end wire which is put on by means of the new tool.

✦ ✦ ✦

THE dead end wire method works equally well for all grades of strand, while break-down serves should not be made on Extra High Strength grade. Furthermore, both methods should be limited to bethanized strand. The action of the tool may damage some hot-dip zinc coatings, whereas the ductile, closely bonded bethanized deposit is left intact, although it may possibly show a slight displacement at some points of contact.

✦ ✦ ✦

IN making regular break-down serves, using lineman's pliers, continuously controlled tension is not attainable, because it is necessary to release the wire between turns, to take a new grip. This condition naturally has an adverse and variable effect on the uniformity of the holding power of the serve, an effect which becomes more and more pronounced with increasing strength of strand.

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FURTHERMORE, a lineman, no matter how skilled, will usually damage the zinc coating with his pliers, thus causing some impairment of the corrosion resistance of the strand at the points of injury. This damage also becomes increasingly aggravated as higher strength strand is used. The combination of these features has resulted in a general abandonment of the old technique in favor of various types of clamps.

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THE new tool, designed to overcome these difficulties as far as bethanized strand is concerned, consists of a primary winding element with developed prongs which so engage the wire that continuous tension is induced as the wire is wound. Chromium plated contact surfaces, hard, smooth and well rounded, minimize displacement of the zinc. The tool has been found practical for making breakdown serves in strand of Common, Siemens-Martin, and High Strength grades, in A, B, and C weights of Bethanized coatings.

✦ ✦ ✦

ALTHOUGH the new tool has made possible a greatly improved break-down serve, the dead end wire procedure offers such important advantages that it may well be expected to find uses to which the former technique was never applicable. It involves the use of a small separate coil of 11-gage bethanized wire, 120 in. long, sufficient to make 50 full turns, or 6 in. of wrapping, on 7/16 in., 7-wire strand.

✦ ✦ ✦

WIRE from the coil is wound around the live and dead ends of the strand, a minimum of 50 turns being sufficient to develop holding power beyond the useful strength of the strand. To avoid complications in stocking and warehousing, only one grade and one length of wire coil is supplied. When used for the smaller sizes of strand the slight excess of wire may be wound in extra turns, or cut off.

✦ ✦ ✦

THE new method has the advantage of being considerably faster than the break-down procedure. Another important feature is, that take-ups can always be made, because the strand is not destroyed, as in break-down serves. When a take-up is required, the original dead end wire is removed, slack is taken up by the

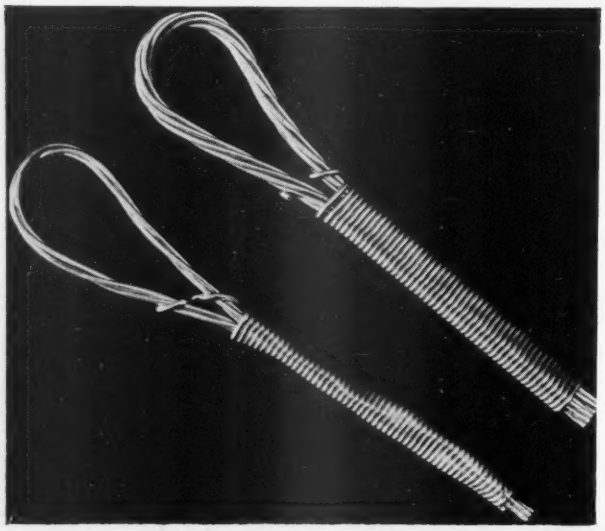

Fig. 1. Typical dead end serves on 3- and 7-wire strands.

usual method, and a new dead end wire put on.

✦ ✦ ✦

REMOVAL of the dead end wire is done by lifting the outer end (the end farthest away from the loop) so that the lower prong of the tool can be engaged under it. The wire is unwound 8 to 10 turns, which opens it into a helix approximately three times the diameter of the strand. The tool is then removed and the balance of the wire taken off by hand.

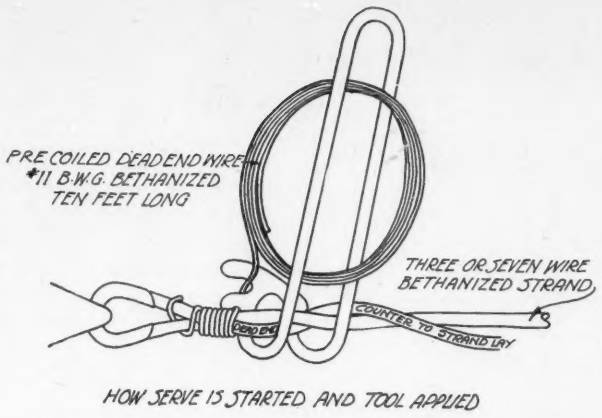
PRE COILED DEAD END WIRE
#11 B.W.G. BETHANIZED
TEN FEET LONG
THREE OR SEVEN WIRE
BETHANIZED STRAND
COUNTER TO STRAND LAY
HOW SERVE IS STARTED AND TOOL APPLIED

Fig. 2. With strand made ready for serving the dead end wire wrapping is started with a simple hooked engagement of the strand and one or two turns by hand before the tool is applied. ✦ ✦ ✦

✦ ✦ ✦

THE tool is so simple that any lineman can be taught its use in a few minutes. The winding tension on the wire is steady, not intermittently applied, and the resultant holding power obtained does not depend primarily on the strength and skill of the lineman. It is a much simpler operation than that of making a serve with pliers, as no great effort is required in gripping and holding the wire. The tool does this automatically.

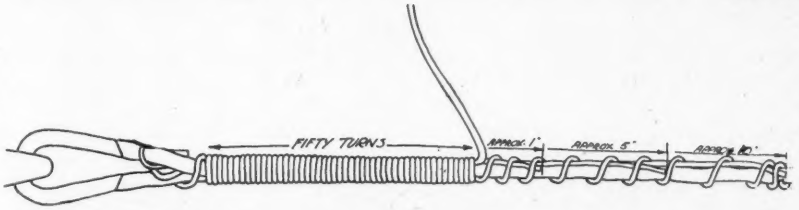

Fig. 3. Vibration-dampening dead end assembly. Fifty turns of serving wire is sufficient wrapping to prevent slippage under load beyond the useful strength of the ruralductor. ✦ ✦ ✦

✦ ✦ ✦

EXTENSIVE tests have proved that the tool adapts itself to the varying sizes and contours of strand around which it rotates, and that it produces consistently tight wrapping throughout the length of the serve.

✦ ✦ ✦

TESTS have also demonstrated that inexperienced men can make serves after watching only one being made. In a recent series of such tests the poorest specimen held without appreciable slip for a pull of 10,300 lbs., with a rated strand breaking strength of 10,800 lbs. All other specimens broke in the main strand outside the serve.

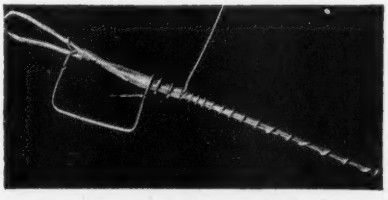

Fig. 4. Dead end assembly with tap for hot line clamp. ✦ ✦ ✦ ✦

THE tool moving across the ridges of parallel strands produces light indentations on the outer wire surfaces of the strand. However, the action is a displacement rather than a removal of the coating, a condition that is not considered serious, because, as is well known, zinc displaced in this manner exerts a protective influence on the adjacent thinned areas.

✦ ✦ ✦

AN interesting application of the new technique is a vibration-dampening dead-end assembly on three-wire ruralductor, as illustrated in Fig. 3. A jumper wire of soft steel laid in the valley between strands, and fifty turns of dead end wire applied. The jumper wire is thus firmly secured, without interfering with the holding power of the dead end and in a manner that insures good electrical contact. Upon completion of the fifty turns the tool is removed and the jumper wire bent back. The come-along is then taken off and the individual wires fanned back. The three wires are cut to lengths of 1 in., 5 in., and 10 in., respectively, and the remaining dead end wire is wrapped by hand as indicated. This arrangement provides an effective vibration damper and takes the place of an assembly requiring the use of three separate clamps.

✦ ✦ ✦

A SIMILAR arrangement used for providing a tap for hot line clamps on three-wire ruralductor is shown in Fig. 4. In this case the end of the jumper wire is shaped into a loop, the free end of which is wrapped around the serve, thus providing a stirrup for the hot line clamp. In the conventional installation of this type four clamps are usually required.

If You Are Not A Member Of The Wire Association—Now Is A Good Time To Join!
The Annual Dues Are $10.00 — For detailed information address
RICHARD E. BROWN, Secretary
300 Main Street, THE WIRE ASSOCIATION Stamford, Conn.

In 1944 the

ANNUAL CONVENTION of the WIRE ASSOCIATION

will be held in

PITTSBURGH, PA.

with headquarters at the William Penn Hotel

The Time: OCTOBER 16th to 19th, inclusive

This change, made necessary by lack of adequate hotel accommodations in Cleveland, is important to note. Members of the WIRE ASSOCIATION will have two days to go to Cleveland for the Metal Show following our Convention, if they so desire.

All hotels are crowded today, so please make your reservations at once. We cannot guarantee you a reservation if you delay.

Please observe the following:

Make reservations direct to the Wire Association.

Specify time of arrival and departure.

State type of accommodations desired.

Reservations will be honored in the order of their receipt.

The Convention at Pittsburgh will have all of the regular features, plus some added advantages not heretofore possible. A technical program of unusual interest has been arranged by the Program Committee, and everything points to this being the finest Convention offered our Members in our fourteen years of meetings.

FOR ADDITIONAL INFORMATION WRITE TO

THE WIRE ASSOCIATION

RICHARD E. BROWN, Executive Secretary

300 MAIN STREET STAMFORD, CONN.

Make your plans now to attend and send reservations early.

✦ GOVERNMENT WIRE PRODUCTION INFORMATION ✦

Machine, Wood, and Sheet Metal Screw Industry Advisory Committee Discuss Rods & Wire

AT a recent meeting of the above Committee, Mr. Sweeney of the Steel Division briefly reviewed the circumstances which made necessary the use of triple-alloy steel in the industry. He commented upon the fact that since alloy scrap is accumulating, the armed services are backing a program for the increased use of triple-alloy steel.

✦ ✦ ✦

A COMMITTEE member said that his company has not been able to obtain sufficient quantities of the 8630 type of Alloy steel to make thorough tests of the material in production of recessed head screws. The question then arose of whether supplies of the 8630 triple Alloy steel can be obtained quickly enough before the 4037 single Alloy type of steel is cut off. It was pointed out that, although there may be no more melts of 4037, it may be possible for the industry to obtain rod and wire from steel already melted. If the rod and wire cannot be secured and if tests are delayed on the 8630 type, the industry will of course have difficulties. Mr. Sweeney advised industry members to keep in touch with their suppliers and with the Steel Division about alloy rod and wire.

✦ ✦ ✦

New CMP Order for SO's

SPECIAL rules under which the War Department may use the SO (small order) allotment symbol for placing authorized controlled materials orders and orders for Class A products have been authorized in a new Controlled Materials Plans direction.

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UNDER the rules, contained in Direction No. 51 to CMP Regulation No. 1, any one purchase order for any Class A product may be placed by the War Department as a small order, using the SO allotment symbol rather than an allotment, where the total amount of controlled materials needed to produce it does not exceed any of the following limits:

Carbon steel (including wrought iron)	**10 tons**
Alloy steel	**1,000 pounds**
Copper and copper base alloys	**300 pounds**
Aluminum	**2,000 pounds**

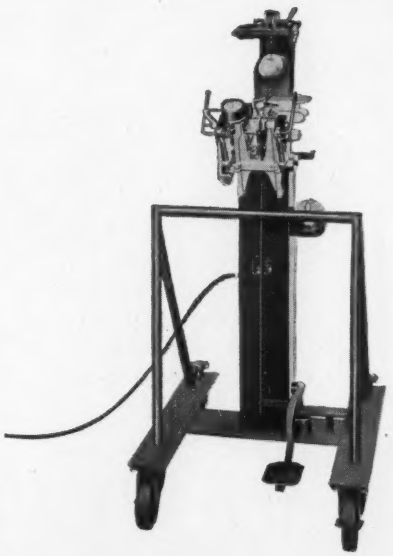
(Please turn to Page 434)

MICROMETER PRECISION MICRO-WELD TRADE MARK REG. U. S. PAT. OFF.

CONTINUOUS IMPROVEMENT

MICRO-WELDERS with dial indicating annealing attachments are now available for high carbon wire.

There is positive control of annealing temperature and already hundreds of these special MICRO-WELDERS are proving their dependability and satisfactory performance with leading manufacturers.



MICRO PRODUCTS COMPANY
20 NORTH WACKER DRIVE, CHICAGO 6, ILL.
Telephone, State 7468

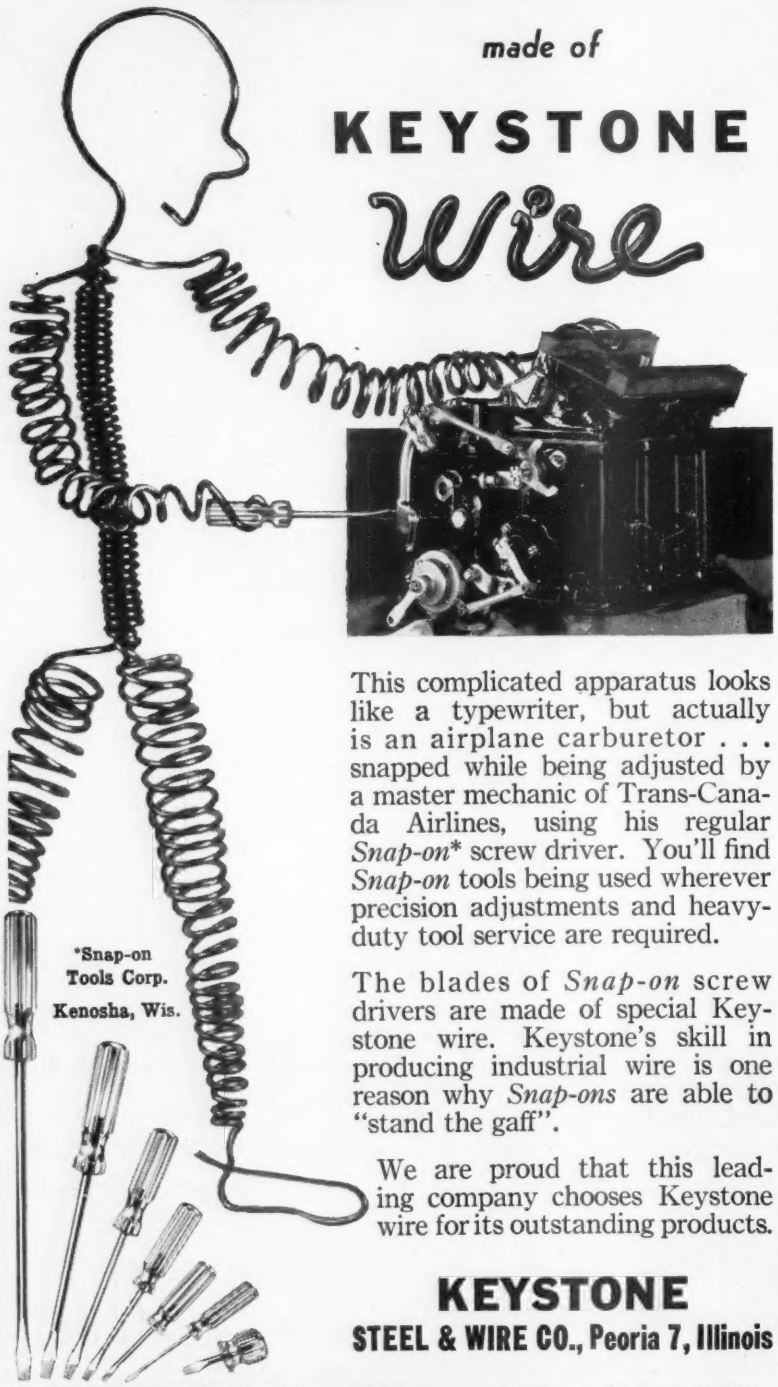
"Always in the Groove"

with "*Snap-on*" Screw Drivers

made of

KEYSTONE

Wire



This complicated apparatus looks like a typewriter, but actually is an airplane carburetor . . . snapped while being adjusted by a master mechanic of Trans-Canada Airlines, using his regular *Snap-on** screw driver. You'll find *Snap-on* tools being used wherever precision adjustments and heavy-duty tool service are required.

The blades of *Snap-on* screw drivers are made of special Keystone wire. Keystone's skill in producing industrial wire is one reason why *Snap-ons* are able to "stand the gaff".

We are proud that this leading company chooses Keystone wire for its outstanding products.

*Snap-on Tools Corp. Kenosha, Wis.

KEYSTONE

STEEL & WIRE CO., Peoria 7, Illinois

Special Analysis Wire for All Industrial Uses

SAMSON SPRING WIRE

Coppered, Tinned, Annealed, Galvanized

Government Wire Production Information

(Continued from Page 433)

Quality of Small Dies Has Improved

STEADY improvement in the quality of small diamond dies required to draw superfine wires, principally for electronics products, was reported by WPB officials at the recent meeting of the Small Diamond Dies Industry Advisory Committee, in Washington.

✦ ✦ ✦

WPB representatives also brought out at the meeting that while requirements continue to be heavy, facilities are available to maintain the present level of wire and die production. Some deferments from military service of highly skilled young diamond die specialists have been obtained, but the officials emphasized in this connection that adequate quality and supply will depend upon continued employment of these skilled workers.

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PHYSICISTS from the National Bureau of Standards discussed current research into improved methods of production and described the assistance made available to industry through reports and demonstrations on die contours, diamond powders, electrical spotting of diamonds and measurement by the interference method.

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Socket Screw Committee Organized

THE Office of Industry Advisory Committees, War Production Board, recently announced the formation of the Socket Screw Industry Advisory Committee. O. F. Fancy, Building Materials Division, is the Government presiding officer. The membership is as follows:

✦ ✦ ✦

LAWRENCE G. BEAN, The Bristol Co., Waterbury, Conn.; John S. Cochrane, Mac-It Parts Co., Lancaster, Pa.; Lewis T. Houillion, Brington Screw and Mfg. Co., Cincinnati, Ohio; A. E. Overton, Safety Socket Screw Co.,

Chicago; J. Franklin Roberts, Standard Pressed Steel Co., Jenkintown, Pa.; Martin Slifka, Parker Kalon Corp., New York City; W. C. Stauble, The Holo-Krome Screw Co., Hartford, Conn.; and W. C. Waldo, Allen Manufacturing Co., Hartford, Conn.

✦ ✦ ✦

THE first meeting of this committee was held on May 17, 1944.

✦ ✦ ✦

Capt. Bach with American Standards Association

CAPTAIN William L. Bach of the War Department has been appointed a member of the American Standards Association's committees on Insulated Wires & Cables; Industrial Control Apparatus; and Electrical Measuring Instruments.

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THE work of these three committees are closely related. The committee on insulated wire and cables (other than telephone or telegraph wire) covers specifications for stranding and sizes of conductors, rubber, varnished cloth, impregnated paper, enamel, cotton and silk insulation, fibrous covering, etc.

✦ ✦ ✦

THE committee on industrial control apparatus is concerned with definitions, service conditions, rating, dielectric strength tests, temperature and other limitations.

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THE scope of the committee on electrical measuring instruments is to set definitions, classification, rating, methods of test, and construction details for all types of electrical measuring instruments, excluding watthour meters, demand devices and their auxiliary apparatus, and low precision or special instruments.

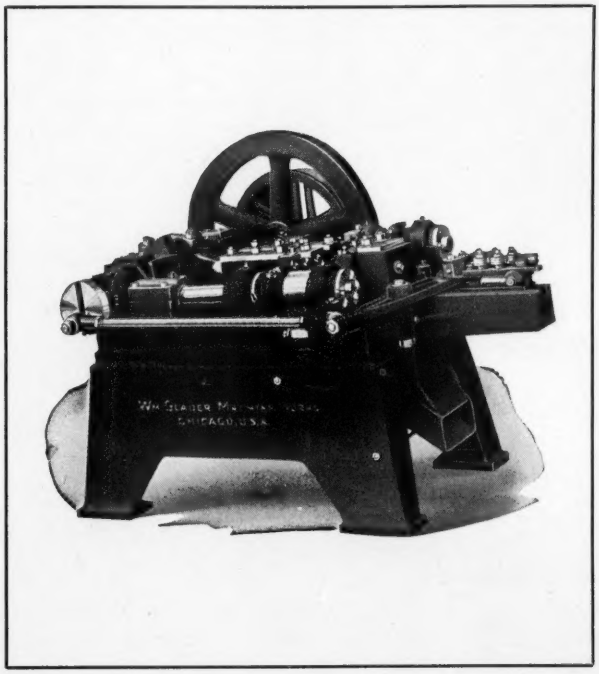
✦ ✦ ✦

New Spring Advisory Committee Formed

APPOINTMENT of ten representatives of manufacturers of precision mechanical springs to an advisory committee has been announced by the Office of Price Administration. It will be the purpose of the industry group to meet with OPA to discuss pricing problems of the industry in the production and sales of precision springs used in watches, gauges, etc. Members appointed to the committee are:

Fuller F. Barnes
Wallace Barnes Company
Bristol, Conn.
A. H. Bitzer, Jr.
Illinois Coil Spring Company
Chicago, Ill.
E. J. Byrnes
Wickwire Spencer Steel Company
New York, N. Y.
J. D. Culbertson, III
Duer Spring & Mfg. Co., Inc.
McKees Rocks, Pa.
E. W. Feldt
Raymond Manufacturing Company
Corry, Pa.
H. J. Frontroth
The Cleveland Wire Spring Co.
Cleveland, Ohio
Lawrence Humason
The Humason Manufacturing Co.
Forestville, Conn.
R. L. Johannsen
Lee Spring Company, Inc.
Brooklyn, N. Y.
Warren A. Peterson
The William D. Gibson Co.
Chicago, Ill.
C. M. Young
L. A. Young Spring & Wire Corp.
Detroit, Mich.

GLADER HIGH SPEED WIRE NAIL MACHINE



High tonnage output, and low maintenance costs, have resulted in Glader Machines being accepted as standard equipment in every large nail mill built in the United States in the past twenty years.

Glader Machines are operating in most of the wire producing mills throughout the world.

These machines are made in eleven different types and sizes. This enables us to cover the range of sizes of nails produced with the greatest efficiency.

For further information please address,

WM. GLADER MACHINE WORKS
210 NO. RACINE AVE.
CHICAGO, ILLINOIS

Outstanding Personalities of the Wire Industry

Wickwire Spencer Steel Promotes Dunlap and Bussmann

ANNOUNCEMENT has been made of the promotion of R. T. Dunlap to the position of Vice President in Charge of Production, and the advance of A. G. Bussman to the position of Assistant to the President, Mr. E. P. Holder.

MR. Dunlap was previously Vice President and General Superintendent of the Buffalo District. Before joining Wickwire Spencer in 1943, he was General Works Manager of the Vulcan Iron Works at Wilkes-Barre, Pennsylvania.

UNDER his direction, the operating efficiency of the Buffalo Plant of the Company has been greatly increased through improvement and rehabilitation of facilities and installation of production economies. Mr. Dunlap will continue to make his headquarters in Buffalo.

✦ ✦ ✦

MR. Bussman previously has been the Assistant to the Executive Vice President of Wickwire Spencer. He has been associated with the Company since 1930 and was successively Sales Manager of the Wire and Springs Divisions, Sales Manager of the Buffalo District, and General Sales Manager. He has long been associated with the steel industry and before his connection with Wickwire Spencer was Chief Chemist of the Donora Steel Works of the American Steel and Wire Company and President of the Standard Steel and Wire Company of Greensburg, Pennsylvania. In his new position Mr. Bussmann will be located at the executive offices of the Company in New York.

✦ ✦ ✦

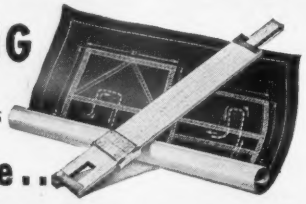
A. S. & W. Makes McGlincy, Manager of Operations At Pittsburgh

E. H. Broden, manager of operations of the Pittsburgh district of the American Steel & Wire Co., a subsidiary of U. S. Steel Corp., is retiring June 1st after almost half a century of service with the company. Mr. Broden was born in Cleveland, Ohio, on November 13, 1877. He has worked for the Wire Company for 48 years starting his career in 1896 in the machine shop of the old H. P. Works in Cleveland.

✦ ✦ ✦

SUCCEEDING Mr. Broden will be L. F. McGlincy, former assistant manager of operations of the Pittsburgh district.

OVEN ENGINEERING NEWS



Wherever You See This Nameplate . . .

You'll Know That { 1. Production has been increased. 2. Cost has been reduced.

A lot of people are beginning to wonder what we **do** make, because we seldom advertise the same equipment twice. The answer is simply that we make **anything** in the field of oven materials handling and processing. We suggest that you keep the following list and call us when you have a production problem. We design standard and special equipment for:

WIRE INDUSTRY

Complete insulation lacquering systems*
Constant tension, variable speed windup machines*
Continuous windup and unwind systems*
Friction payoff stands*
Saturation systems
Lacquer pots*
Drying and preheating rooms*
Experimental solvent resin systems*

FERROUS WIRE AND ROD

Dehydrogenizing ovens
Welding rod coating ovens*

HEAT TREATING

Draw furnaces*
Dehydrogenizing ovens*
Aging ovens*
Blueing ovens
Thermal shock systems*

**Indicates standard sizes and types of these units are available.*

FREE DATA

Much of the above listed equipment is fully described in our FREE engineering book, "Blueprint for Industry—Part II".

(This is No. 8 of a series. Reprints of previous advertisements will be sent free upon request.)

THE INDUSTRIAL *Oven Engineering* COMPANY

11621 Detroit Avenue **Cleveland, Ohio**

Industry Leader Passes On

JOSEPH McClintock Garris (1872-1944) will be missed by thousands of business men from coast to coast. He was known and revered for his leadership in promoting safety in materials-handling with slings, and for his philosophy of life which stimulated and encouraged his friends to "go thou and do likewise, my good and faithful servant".

✦ ✦ ✦

MR. Garris held several basic patents on slings, notable among them his ATLAS braided Wire Rope Sling, manufactured by Macwhyte Company, of Kenosha, Wisconsin.

✦ ✦ ✦

HE joined forces with Macwhyte Company in 1931, and since then has been manager of the Sling Division. His son, Erwin F. Garris, also widely known, has been his assistant and will carry on in the footsteps of his father.

✦ ✦ ✦

Frederick John Willits

Frederick J. Willits, Purchasing Agent, Waterbury Farrel Foundry and Machine Company, Waterbury, Connecticut, died May 27 at the Waterbury Hospital after an illness of two weeks. Mr. Willits was born October 10, 1884 in England, but had been a resident of Waterbury for 57 years. He entered the employ of the Waterbury Farrel Company as a youth and had been associated with the company 46 years. He was advanced to Purchasing Agent in 1927. He is survived by his wife and one daughter.

✦ ✦ ✦

Ajax Manufacturing Company Engineer Passes

Henry A. Zwierlein, 55, Chief Engineer of The Ajax Mfg. Company, Cleveland, Ohio, died May 7th after a brief illness. He joined the Ajax Engineering Department in 1919, and had served as Chief Engineer for the past eighteen years.

Joins North American Philips Company

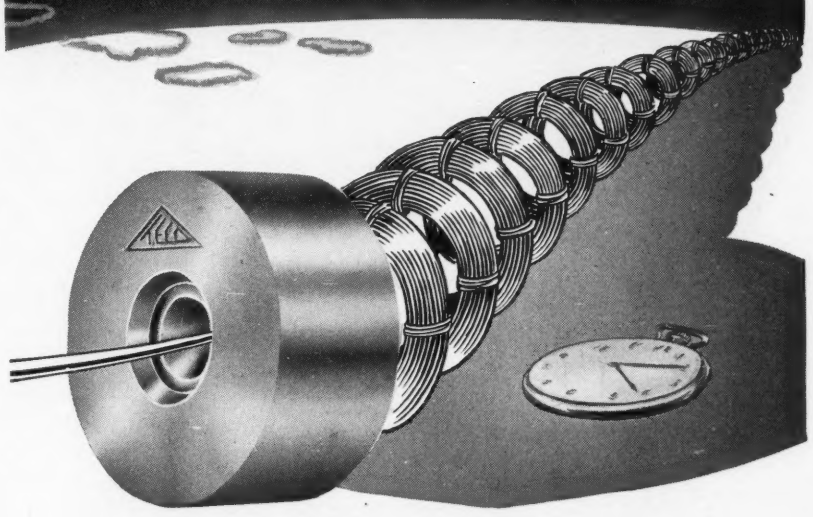
T. R. Porter has joined the staff of North American Philips Company, Inc. as technical-commercial man on high frequency heating. He will be located at the Company's headquarters, 100 East 42nd Street, New York. Mr. Porter has been with Westinghouse for the past eight years where he did considerable development work in the electronic field.

Pittsburgh Steel Adds to Staff

Wm. R. Thompson has become associated with the Stainless Products Sales Department of Pittsburgh Steel Company, Pittsburgh, Pa. For the past eight years he was Manager of Stainless Sales for Jessop Steel Company, Washington, Pa.

(Please turn to Page 440)

Longer Runs Between Die Changes!



The longer drawing life of TECO Cemented Carbide reduces time lost for die changing — increases the productive time of your machines — uncovers extra tonnage capacity in your plant.

TECO Cemented Carbide stays on the job longer because it is harder, denser, more uniform in structure . . . therefore more resistant to wear and friction. TECO Cemented Carbide Dies produce greater tonnage of wire . . . all smoothly-finished . . . all on-size. A test run in your plant offers the most convincing proof. Discuss your needs with our engineers.

WIRE and BAR DIES—SIZING DIES
EXTRUDING DIES — TUBING DIES
Carbide Blanks, Tools, Bits, Reamers, Broaches, Forming Tools

TUNGSTEN ELECTRIC CORPORATION, 564 39th St., Union City, N. J.
Branch Office: 2906 Euclid Avenue, Cleveland, Ohio
Representative: Architects & Builders Bldg., Indianapolis, Ind.

TECO Pioneers in Tungsten Carbides for over a Quarter Century **CARBIDE DIES**

A Review of Recent Wire Patents

No. 2,347,908, WIRE STITCHING MACHINE, patented May 2, 1944 by Roy G. Hoffert, Racine, Wis.

This is a mechanical electrical stitcher, including a clutch device for throwing the staple-driving mechanism in and out of operation.

✦ ✦ ✦

No. 2,348,595, WIRE WINDING MECHANISM, patented May 9, 1944 by Bruce N. Bletso, East Cleveland, and Clifford F. Hood, Shaker Heights, Ohio, and William S. Morgan, Plainfield, Ill., assignors to The American Steel and Wire Company of New Jersey, a corporation of New Jersey.

The mechanism is adapted for winding wire from the die. There are 13 claims.

✦ ✦ ✦

No. 2,348,641, ELECTRIC CABLE, patented May 9, 1944 by Arthur L. Parker, Cleveland, Ohio, assignor to The Parker Appliance Company, Cleveland, Ohio, a corporation of Ohio.

Invention lies in a ribbed and grooved tube surrounding the sheathing about the wire conductor.

✦ ✦ ✦

No. 2,348,752, ELECTRIC CABLE, patented May 16, 1944 by Joshua Creer Quayle, Ashton, Chester, England, assignor to International Standard Electric Corporation, New York, N. Y.

An air-space cable is provided, comprising two conductors wound in an open helix, with glass fibre coverings, each in a separate dielectric tube, and a conducting screen embracing both tubes.

Complete Descriptions and Drawings of Patents May Be Had for 25 cents; outside United States and Canada, $1.00. Address, Wire & Wire Products, 300 Main St., Stamford, Conn.

✦ ✦ ✦

No. 2,348,850, ART OF SCREW ROLLING, patented May 16, 1944 by Cecil C. Richards, Union City, N. J., assignor to Groov-Pin Corporation, Union City, N. J., a corporation of New York.

This method consists in rolling uninterrupted threads upon the screw shank by impression of the parts of the rolling shank by impression of the threads concurrently into diametrically opposed parts of the rolling shank, thereupon rolling cutting grooves extending from the entering end of the shank transversely of the threads and finally cleaning up unevenness or burrs produced by the cutting groove rolling, by resumption of the initial thread rolling operation.

✦ ✦ ✦

No. 2,348,856, STRAND HANDLING APPARATUS, patented May 16, 1944 by John N. Selvig, Westfield, N. J., assignor to Western Electric Company, Incorporated, New York, N. Y., a corporation of New York.

The apparatus includes a device for imposing controlled tension on an advancing wire strand.

✦ ✦ ✦

No. 2,348,897, SPRING FOR BEDS OR MATTRESSES, patented May 16, 1944 by Benjamin Gladstone, Lynn, Mass.

For a duplex bed mattress structure two substantially identical spring sections are combined in reverse relation to each other as to form a spring structure having a duplex body and a border on at least two opposite sides thereof of springs stronger than the springs of the body sections.

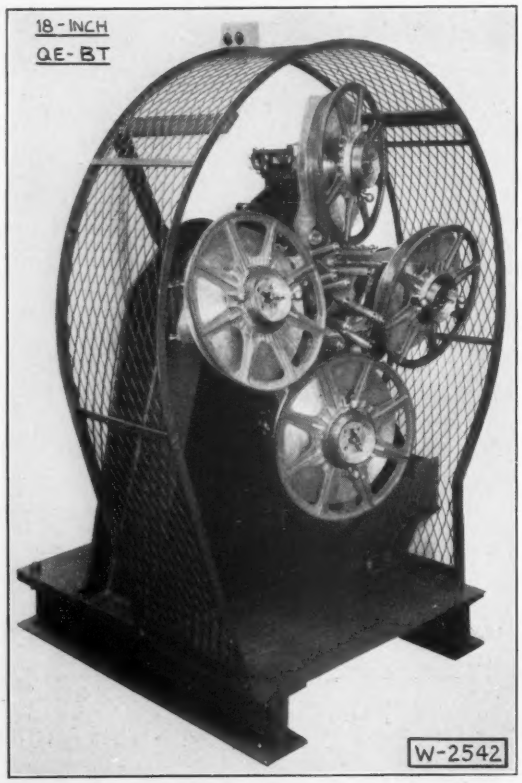
✦ ✦ ✦

No. 2,349,104, WIRE-DRAWING MACHINE, patented May 16, 1944 by Weld Morgan, Worcester, Mass., assignor to Morgan Construction Company, Worcester, Mass., a corporation of Massachusetts.

Included are connections, whereby both a small loop and a safety bar are adapted to actuate a stop switch independently of die movement.

✦ ✦ ✦

No. 2,349,266, IRON AND STEEL PRODUCTS AND PROCESS OF PRODUCING THE SAME, patented May 23, 1944 by James C. Hartley, Norwalk, Conn., and Otto H. Henry, Caldwell, N. J., assignors to Minerals and Metals



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ESTABLISHED 1845
PATERSON, NEW JERSEY, U. S. A.

ELECTRICAL WIRE and CABLE and WIRE ROPE MACHINERY

Eccentric Taping Heads Type "BT" for all non-metallic tapes. Patented constant tension. Available in many sizes and combinations. All anti-friction bearing, magnesium and aluminum alloy construction. Rapid self-locking adjustments. Automatic stops and signal lights. Fixed selective multi-speed tumbler or infinitely variable speed head drives. —

Metal tapers and high speed, dynamically balanced concentric tapers are also offered and employ the same patented principles.

LITERATURE ON REQUEST

Corporation, New York, N. Y., a corporation of Delaware.

As an inclusion within the matrices of the grains of the iron or steel and in noneutectic relation to the metal, is a compound of sulphur, phosphorus, titanium or silicon, but excluding manganese sulphide.

✦ ✦ ✦

No. 2,349,413, ELECTRICAL CONDUCTOR CARRYING VINYL RESIN COMPOSITION, patented May 23, 1944 by William F. Hemperly, Bloomfield, N. J., assignor to Union Carbide and Carbon Corporation, a corporation of New York.

About the wire conductor is a dielectric comprising a resinous monovinyl polymer and derived predominantly from monomeric vinyl chloride and a plasticizer comprising di(2-ethylhexyl) phthalate.

✦ ✦ ✦

No. 2,349,591-3, SELF - LOCKING SCREW DEVICE, patented May 23, 1944 by Richard T. Hosking, Wilmette, Ill., assignor by mesne assignments, to Illinois Tool Works, Chicago, Ill., a corporation of Illinois.

These three patents cover screws with locking portions embracing only a very limited portion of the shank.

✦ ✦ ✦

No. 2,349,651, SCREW THREAD FOR HIGH STRENGTH BOLTING, patented May 23, 1944 by Evan A. Davis, Wilkinsburg, Pa., assignor to Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., a corporation of Pennsylvania.

In this bolt and nut assembly, invention lies in the threads of the nut. The threads are undercut in line with the faces of the threads to thus make the threads flexible in the direction of the pull of the bolt.

✦ ✦ ✦

No. 2,349,652, WIRE DRAWING DIE, patented May 23, 1944 by James M. Fenner, South Euclid, Ohio, assignor to The American Steel and Wire Company of New Jersey, a corporation of New Jersey.

The die hole has a tapered portion arranged on the entrance side thereof which terminates in a main bearing portion having substantially parallel side walls a predetermined length with the side walls of the tapered portion having an angle with each other of approximately from 3½ to 10 degrees, the length of the bearing portion varying directly as the angle of the side walls of the tapered portion varies.

✦ ✦ ✦

No. 2,349,708, WIRE DRAWING, patented May 23, 1944 by Flint C. Elder, Cleveland Heights, Ohio, assignor to The American Steel and Wire Company of New Jersey, a corporation of New Jersey.

This process consists in applying to the wire a wire-drawing lubricant consisting essentially of a dry mixture of sulphur and wire-drawing soap in the proportions of from two to four parts by weight of sulphur and from one to three parts by weight of wire-drawing soap.

✦ ✦ ✦

No. 2,349,750, METHOD AND APPARATUS FOR FORMING WIRE ENTANGLEMENTS, patented May 23, 1944 by Carl H. Peterson and William V. Moren, Worcester, Mass., assignors to The American Steel and Wire Company of New Jersey, a corporation of New Jersey.

The method for making wire entanglements, adapted to be axially expanded, comprises forming a helix of wire and independently joining juxtaposed convolutions to one another at a multiplicity of predetermined circularly spaced locations by independent joints staggered along the helix as the juxtaposed convolutions are being formed.

✦ ✦ ✦

No. 2,349,873, UNCOILING DEVICE, patented May 30, 1944 by John Lisy, Cleveland, Ohio, assignor to The American Steel and Wire Company of New Jersey, a corporation of New Jersey.

Included, are a pair of platforms with bundle supporting surfaces inclined downwardly toward one another, respective bundle positioning cores mounted on the platforms, each core carrying a coil-separating element comprising an inner annular member engageable with the upper end of the core and an outer coil separating ring connected to the inner ring, and a barrier located between these cores and adapted to prevent intertwining of the bundles carried thereby.

✦ ✦ ✦

No. 2,349,897, APPARATUS FOR POLISHING WIRE, patented May 30, 1944 by Tom Wilson, Baltimore, Md., assignor to Bethlehem Steel Company, a corporation of Pennsylvania.

The dies of the apparatus are adapted to be swung inwardly by centrifugal force during rotation of the frame of the apparatus. There are 21 claims.

✦ ✦ ✦

No. 2,349,951-2 ELECTRICAL CONDUCTOR, patented May 30, 1944 by Calvin S. Fuller, Chatham, and Archie

(Please Turn to Page 453)

We take pride in announcing that the Army-Navy "E" pennant now flies over our plant. No greater honor than this award for outstanding production of war material has ever come to our organization. It is our solemn resolve that the unity of purpose that achieved this recognition shall continue; that our efforts to discharge the responsibility it entails shall never relax for an instant.

HUBBARD SPOOL COMPANY
1624 CARROLL AVENUE | CHICAGO, ILLINOIS
Since 1912, manufacturers of wire drawing and annealing, and shipping spools and reels.
PLANTS AT CHICAGO, ILLINOIS AND GARRETT, INDIANA

(Continued from Page 437)

Eutectic Welding Alloys Makes Appointment

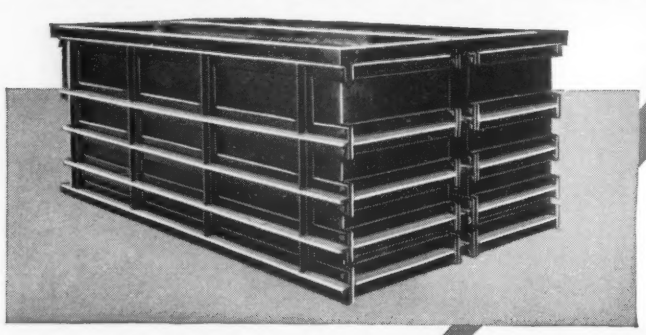
CLINTON E. SWIFT has been appointed assistant manager of the Engineering and Research Department of Eutectic Welding Alloys Co., New York. Before joining Eutectic, Mr. Swift was the manager of the welding division of Ampco Metal, Inc.; prior to that he had been on the engineering staffs of C. F. Braun Co. of Cal., American Brass Co. and Westinghouse Electric & Mfg. Co., East Pittsburgh.

✦ ✦ ✦

American Machine & Metals Appoints Miller

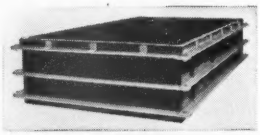
EDWARD L. MILLER has been made manager of engineering, in charge of design engineering and the research departments, American Machine & Metals, Inc., East Moline, Ill. He succeeds **C. W. Anderson** recently promoted to vice-president and general manager of the company's new subsidiary, U. S. Gauge Co., Sellersville, Pa.

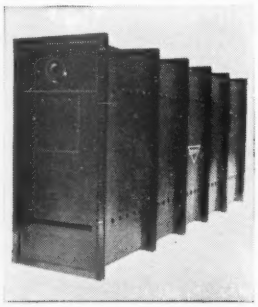
FOR PICKLING AND PLATING



HAVEG

RECTANGULAR TANKS





HAVEG is a molded plastic which is unaffected by acids, alkalies, and chemicals generally. It is *not* a lining or coating but is resistant throughout its entire mass.

Rectangular Tanks as large as 12 feet long are made in seamless one-piece units. These tanks are made in standard sizes in which the outside dimensions are multiples of 6". This standardization permits the production of an almost unlimited number of standard sizes in which no single dimension will vary more than 3" from a customer's requirement.

Bulletin F-3 gives complete engineering, design and application data on all types of Haveg Equipment, Pipe and Fittings. Send for your copy.

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HXP-43

HAVEG CORPORATION

NEWARK, DELAWARE

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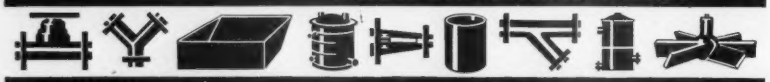

CLEVELAND 14 — 550 Leader Building

CHICAGO 11 — 1201 Palmolive Building

DETROIT 11 — 2832 E. Grand Blvd.

LOS ANGELES 13 — 601 W. Fifth St.

Donnellan Joins General Alloys

H. H. Harris, President of General Alloys Company, Boston, has announced that **J. Edward Donnellan,** known to thousands in the Metal field for his work with the American Society for Metals, has resigned from that organization to join the General Alloys Company as Vice President in Charge of Sales, effective July 1. In leaving for his new post, Donnellan predicted that past progress in the high temperature alloy field will be eclipsed by engineering developments immediately after the war.

✦ ✦ ✦

SINCE the time he graduated from Pratt Institute as an industrial chemical engineer, Donnellan has been directly associated with the metal industry. He has been with the New Departure Manufacturing Co., the United States Naval Experimental Station, the Halcomb Steel Co., and later became Chief Chemist and Metallurgist for a steel foundry.

✦ ✦ ✦

JOINING the ASM in 1924, he was named secretary of its National Technical Committees, the position in which he served for the past twenty years. His work necessarily has brought him into close contact with many leaders of industry.

✦ ✦ ✦

DONNELLAN is probably best known for his work as editor of the Metals Handbook. In this position he maintained contact with technical authorities, followed the technological advances in metallurgy, and paced the activities of the industry generally. Six complete editions of Metals Handbook were produced under his guidance, progressing from a loose leaf edition to the present 2,000 page volume.

✦ ✦ ✦

HE brings to General Alloys an unusually broad knowledge of metallurgical processes and an acquaintance among metal men that is matched by few. Our best wishes for his continued success go with him.

Los Angeles Meeting of the Wire Association

ON June 9, 1944 the first Los Angeles Regional Meeting of the Wire Association was held at the Biltmore Hotel, Los Angeles, California with an attendance of fifty-five.

✦ ✦ ✦

THE meeting consisted of a "get-together" session followed by a dinner at which the presiding officer was **"Ken" Davis,** President of the K. H. Davis Wire and Cable Co., of Los Angeles.

✦ ✦ ✦

MR. Davis opened the dinner by reading a telegram of greeting from D. D. Buchanan, General Works Manager, Union Drawn Steel Division of the Republic Steel Corporation, President of the Wire Association.

✦ ✦ ✦

THE dinner speaker was **Major Richard E. Brown,** Executive Secretary of the Wire Association who spoke briefly outlining the objectives and purposes of the Association. Following this there was an intermission; then a technical session at which a most informative paper on the "Tungsten Die" was presented by **Mr. A. R. Zapp,** Manager, Firthaloy Division, Firth-Sterling Steel Co., McKeesport, Pa.

✦ ✦ ✦

THERE was quite a lot of discussion on the paper and at its conclusion the meeting ended with a showing of the Navy Department film "Seabees — The Navy's Construction Battalions."

✦ ✦ ✦

DETAILS in connection with the meeting were in charge of a committee consisting of **K. H. Davis,** President K. H. Davis Wire & Cable Co., Los Angeles, **Emerson Spear,** Vice-Pres. Pacific Wire Rope Corp., Los Angeles, **A. R. Zapp,** Firth Sterling Steel Co., Los Angeles.

AT the meeting all registrations and details were most ably conducted by **Mrs. R. S. Spengel,** Assistant Secretary of the Wire Association, Stamford, Conn.

✦ ✦ ✦

THOSE present were:

BARLOW, ROGER S., Chief Engr.,
Phelps Dodge Copper Products Corp.,
6100 Garfield Ave., Los Angeles 22, Calif.

BELLEFONTAINE, DAN, Engineer,
California Spring Co., Inc.,
1746 So. Los Angeles St., Los Angeles, Calif.

BLEDSOE, CORDELL J., Purch. Mgr.,
California Spring Co., Inc.,
1746 So. Los Angeles St., Los Angeles, Calif.

CADE, R. R., Foreman, Die Room,
K. H. Davis Wire & Cable Corp.,
2417 East 23rd St., Los Angeles 11, Calif.

CHRISTIE, C., Prod. Mgr.,
K. H. Davis Wire & Cable Corp.,
2417 East 23rd St., Los Angeles 11, Calif.

CHRISTIE, C. I., Office Mgr.,
Firth-Sterling Steel Co.,
1327 Santa Fe Ave., Los Angeles, Calif.

COFFIELD, RAY E., Prod. Control,
California Spring Co., Inc.,
1746 So. Los Angeles St., Los Angeles, Calif.

CONLAN, JOE. F., Office Mgr., Pur. Agt.,
K. H. Davis Wire & Cable Corp.,
2417 East 23rd St., Los Angeles 11, Calif.

COOPER, HARRY S., President,
Cooper Screw Mfg. Co.,
4466 Worth St., Los Angeles, Calif.

DAVIS, K. H., President,
K. H. Davis Wire & Cable Corp.,
2417 East 23rd St., Los Angeles 11, Calif.

(Please turn to Page 442)

First Quarter Steel Capacity, Production and Shipments

Steel Products	Number of Companies	Items	Maximum Annual Capacity Net Tons	MARCH 1944 Production Net Tons	MARCH 1944 Production Per cent of capacity	MARCH 1944 Shipments (Net Tons) Total	MARCH 1944 Shipments (Net Tons) To members of the industry for conversion into further finished products	To Date This Year Production Net Tons	To Date This Year Production Per cent of capacity	To Date This Year Shipments (Net Tons) Total	To Date This Year Shipments (Net Tons) To members of the industry for conversion into further finished products
Ingots, blooms, billets, tube rounds, sheet and tin bars, etc.	45	1	xxxx	xxxx	xxx	717,393	225,277	xxxx	xxx	2,129,905	649,507
Structural shapes (heavy)	10	2	8,977,450	362,630	48.3	357,484	xxxx	1,074,436	48.6	1,047,552	xxxx
Steel piling	4	3		4,873		3,750	xxxx	9,405		9,276	xxxx
Plates (sheared and universal)	23	4	15,990,020	1,235,756	91.2	1,204,568	40,019	3,557,742	89.5	3,457,871	123,643
Skelp	6	5	xxxx	xxxx	xxx	77,542	60,617	xxxx	xxx	219,216	170,090
Rails—Standard (over 60 lbs.)	4	6	3,625,000	205,472	66.9	211,223	xxxx	596,214	66.1	592,975	xxxx
—All other	6	7	518,600	15,782	35.9	15,208	xxxx	42,347	32.8	45,514	xxxx
Splice bars and tie plates	13	8	1,703,700	73,248	50.7	72,927	xxxx	204,577	48.3	205,944	xxxx
Track spikes	10	9	373,200	13,116	41.5	14,359	xxxx	36,176	39.0	37,362	xxxx
Hot Rolled Bars—Carbon	36	10	xxxx	772,773	xxx	654,752	81,089	2,243,264	xxx	1,888,152	244,256
—Reinforcing—New billet	13	11	xxxx	44,907	xxx	46,430	xxxx	110,249	xxx	112,751	xxxx
—Rerolled	14	12	xxxx	10,776	xxx	11,237	xxxx	25,286	xxx	28,896	xxxx
—Alloy	22	13	xxxx	285,542	xxx	207,598	41,174	838,416	xxx	610,737	110,640
—Total	44	14	21,207,210	1,113,998	62.0	900,017	122,263	3,217,215	61.0	2,640,536	354,896
Cold Finished Bars—Carbon	25	15	xxxx	162,177	xxx	162,580	xxxx	464,365	xxx	461,177	xxxx
—Alloy	22	16	xxxx	34,864	xxx	32,927	xxxx	109,967	xxx	97,774	xxxx
—Total	31	17	2,694,110	197,041	86.3	195,507	xxxx	574,330	85.7	558,951	xxxx
Tool steel bars	18	18	214,970	13,135	72.1	12,211	xxxx	37,542	70.2	32,319	xxxx
Pipe and Tubes—Butt weld	16	19	2,289,130	124,159	64.0	121,710	xxxx	367,859	64.6	347,555	xxxx
—Lap weld	8	20	967,900	56,290	68.6	52,548	xxxx	155,308	64.5	148,434	xxxx
—Electric weld	9	21	1,225,170	53,630	51.7	54,133	xxxx	164,971	54.2	164,262	xxxx
—Seamless	15	22	2,659,250	212,120	94.1	205,482	xxxx	604,365	91.4	589,932	xxxx
—Conduit	7	23	184,500	4,973	31.8	4,362	xxxx	12,109	26.4	11,825	xxxx
—Mechanical tubing	11	24	1,004,450	74,176	87.1	76,446	xxxx	214,513	85.9	219,475	xxxx
Wire rods	25	25	6,840,210	396,116	68.3	111,376	38,623	1,116,800	65.7	310,252	85,612
Wire—Drawn	40	26	5,468,850	318,040	68.6	181,132	4,802	906,243	66.6	505,491	12,540
—Nails and staples	18	27	1,224,880	62,169	59.9	61,087	xxxx	183,747	60.3	179,103	xxxx
—Barbed and twisted	15	28	551,720	22,467	48.1	21,563	xxxx	64,545	47.0	63,565	xxxx
—Woven wire fence	15	29	1,101,090	33,984	36.4	34,627	xxxx	97,088	35.5	97,321	xxxx
—Bale ties	12	30	150,660	7,312	57.3	6,889	xxxx	21,094	56.3	19,242	xxxx
Black Plate—Ordinary	9	31	xxxx	xxxx	xxx	39,512	99	xxxx	xxx	103,945	361
—Chemically treated	8	32	464,000	14,765	37.6	14,055	xxxx	44,368	38.5	42,253	xxxx
Tin and Terne Plate—Hot dipped	9	33	3,452,400	148,983	50.9	166,592	xxxx	400,161	46.6	445,026	xxxx
—Electrolytic	10	34	1,780,450	53,980	35.8	56,545	xxxx	138,624	31.3	128,507	xxxx
Sheets—Hot rolled	28	35	19,611,270	1,104,013	66.4	558,724	22,365	3,119,493	64.0	1,615,737	63,228
—Cold rolled	14	36	7,318,780	317,239	51.2	175,552	xxxx	884,097	48.6	493,586	xxxx
—Galvanized	15	37	2,686,410	112,284	49.3	118,962	xxxx	306,745	45.9	303,204	xxxx
Strip—Hot rolled	22	38	7,307,280	236,598	38.2	155,600	22,778	655,051	36.1	432,407	65,197
—Cold rolled	34	39	3,236,940	99,594	36.2	98,091	xxxx	282,073	35.0	268,009	xxxx
Wheels (car, rolled steel)	5	40	348,800	27,209	92.1	26,118	xxxx	75,107	86.6	74,686	xxxx
Axles	6	41	416,170	19,609	55.6	19,873	xxxx	53,969	52.2	54,156	xxxx
All other	6	42	150,270	3,932	30.9	6,027	xxxx	9,355	25.0	15,361	xxxx
TOTAL STEEL PRODUCTS	154	43	xxxx	xxxx	xxx	6,146,795	530,839	xxxx	xxx	17,614,955	1,525,276

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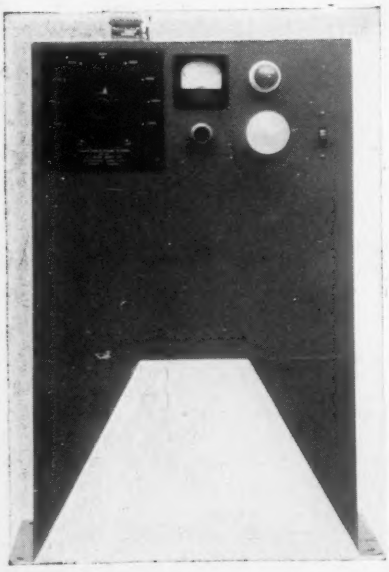


THIS APPARATUS WILL LOCATE DIELECTRIC FAULTS while the wire is being insulated. When breakdown occurs, the operator is notified by an audible alarm. A resettable counter gives the number of faults in each reel. By sorting out the defective reels in this operation, the majority of the resparking is eliminated. Continuous range of voltage at the electrode is from one thousand to sixteen thousand volts. The sparker is equipped with voltmeter reading in kilovolts, and automatic interlock with the takeup motor.

R. L. Davis Electric Co.

Wallingford, Conn.

Los Angeles Meeting of the Wire Association

(Continued from Page 441)

DAVIS, WADE H., Manager,
Firth-Sterling Steel Co.,
1327 Santa Fe Ave., Los Angeles, Calif.

DOODY, J. W., Sales,
Carboloy Company, Inc.,
5905 Pacific Blvd., Huntington Park, Calif.

EHRICH, H. R., Chief Engr.,
Norris Stamping & Mfg. Co.,
5215 Boyle Ave., Los Angeles, Calif.

FINLAYSON, GEORGE, Foreman,
Phelps Dodge Copper Products Corp.,
1604 Olhambra Road, South Pasadena, Calif.

FOSI, M. E., Foreman,
General Cable Corporation,
3600 E. Olympic Blvd., Los Angeles, Calif.

FRAZIER, CHARLES, Chief Electrician,
Pacific Tube Co.,
5710 Smithway, Los Angeles, Calif.

FRY, E. L., Sales Repr.,
Carboloy Company, Inc.,
420 Market St., San Francisco, Calif.

GLENDINNING, WALTER, Asst. Supt.,
Phelps Dodge Copper Products Corp.,
6100 Garfield Ave., Los Angeles 22, Calif.

HEAVRIN, GEO., Asst. Mgr.,
California Spring Co., Inc.,
1746 So. Los Angeles St., Los Angeles, Calif.

HENDERSON, E. S., Asst. Mdse. Director,
Ducommun Metals & Stamping Co.,
4890 So. Alameda, Los Angeles, Calif.

HOWARD, A. H., Secy. & Gen. Mgr.,
Tri-State Supply Corp.,
544 So. San Pedro St., Los Angeles, Calif.

JONES, J. HOMER, Plant Mgr.,
Planett Manufacturing Co.,
200 So. Dolan St., Downey, Calif.

KENT, W. H., Asst. Supt.,
Phelps Dodge Copper Products Corp.,
6100 Garfield Ave., Los Angeles, Calif.

KEPLINGER, WESLEY G., Chief Engr.,
Pacific Tube Co.,
5710 Smithway, Los Angeles, Calif.

KEPP, WM. HARRISON, JR., Pur. Agt.,
Pacific Tube Co.,
5710 Smithway, Los Angeles, Calif.

KILLIAN, G. L., Owner,
Acme Wire & Steel Co.,
4068 Avalon Blvd., Los Angeles 11, Calif.

KINCH, CLARENCE, Foreman,
California Spring Co.,
3633 Globe Ave., Los Angeles 34, Calif.

KISCO, WM. S., Serv. Engr.,
Firth-Sterling Steel Co.,
McKeesport, Pa.

LAUTENSCHLEGER, G. O., Foreman,
California Spring Co., Inc.,
1746 So. Los Angeles St., Los Angeles, Calif.

LUHRS, A. F., Supt.,
K. H. Davis Wire & Cable Corp.,
2417 East 23rd St., Los Angeles 11, Calif.

MARTINO, JOSEPH, Plant Engr.,
Bohn Aluminum Co.,
19200 S. Western Ave., Los Angeles, Calif.

MATIGNON, ED., Owner,
Golden Gate Mfg. Co.,
1250 Powell St., Oakland 8, Calif.

MEAD, L. W., Asst. Pac. Mgr.,
Firth-Sterling Steel Co.,
1327 Santa Fe Ave., Los Angeles, Calif.

MORGAN, JAMES L., Indus. Engr.,
K. H. Davis Wire & Cable Corp.,
2417 East 23rd St., Los Angeles 11, Calif.

MOZENA, ROBERT E., Salesman,
Wickwire Spencer Steel Co.,
1111 Park Central Bldg., Los Angeles, Calif.

MUNGALL, R. W., Plant Mgr.,
Essex Wire Corp. of Calif.,
P.O. Box 30, Anaheim, Calif.

MURPHY, JOHN E., Sales,
California Spring Co., Inc.,
1746 So. Los Angeles St., Los Angeles, Calif.

NABORS, VANCE R.,
Ducommun Metals & Supply Co.,
4890 So. Alameda St., Los Angeles, Calif.

NEUHART, J. H., Pres. & Gen. Mgr.,
California Spring Co., Inc.,
1746 So. Los Angeles St., Los Angeles, Calif.

PETERSEN, VICTOR, Mill Supt.,
Phelps Dodge Copper Products Corp.,
6100 Garfield Ave., Los Angeles, Calif.

RIBAL, GEORGE, Sales,
Wickwire Spencer Steel Co.,
412 W. 6th St., Los Angeles, Calif.

RIDER, F. A., Salesman,
Republic Steel Corp.,
610 Edison Bldg., Los Angeles 13, Calif.

(Please turn to Page 443)

Issues Catalog of Motion Pictures, Booklets, and Visual Aids On Aluminum

THE **Aluminum Company of America** has published a catalog entitled, "Alcoa Library", which lists the various educational booklets, films and visual aids that they have had prepared to answer questions on alumium, its processing and its uses.

✦ ✦ ✦

TO anyone interested in the subject of aluminum, directly or indirectly, they will be glad to send this catalog, and from this one can arrange to secure without charge any of the items listed on particular subjects of interest. Also described in it is the procedure on how to borrow one or more of the motion pictures. An interesting chapter is devoted to the question of how to put on a motion picture show. Just write to the Aluminum Company of America, Room 1032, Oliver Building, Pittsburgh, Pa., if you want a copy of the "Alcoa Library".

✦ ✦ ✦

Los Angeles Meeting of the Wire Association

(Continued from page 442)

SHANNON, L. H., Mech. Supervisor,
Norris Stamping & Mfg. Co.,
5215 S. Boyle Ave., Los Angeles, Calif.

SISCHO, F. R., Executive Officer,
Signal Corps, P.F.O.,
315 W. 9th St., Los Angeles, Calif.

SMITH, NORMAN L., Plant Supt.,
General Cable Corp.,
3600 E. Olympic Blvd., Los Angeles, Calif.

SPEAR, EMERSON, V. P. & Gen. Mgr.,
Pacific Wire Rope Co.,
1840 E. 15th St., Los Angeles, Calif.

STANFORD, W. B., Purch. Agent,
Phelps Dodge Copper Products Corp.,
6100 Garfield Ave., Los Angeles, Calif.

STRACY, H. H., Dist. Sales Repr.,
Colorado Fuel & Iron Corp.,
733 East 60th St., Los Angeles, Calif.

VAN DYKE, S. B., Master Mech.,
Pacific Tube Co.,
5710 Smithway, Los Angeles, Calif.

WASHBURN, L. L., Major,
Signal Corps,
1388 E. 7th St., Los Angeles, Calif.

WOODLAND, CHAS. T., Die Room Foreman,
Pacific Tube Co.,
5710 Smithway St.,
Los Angeles, Calif.

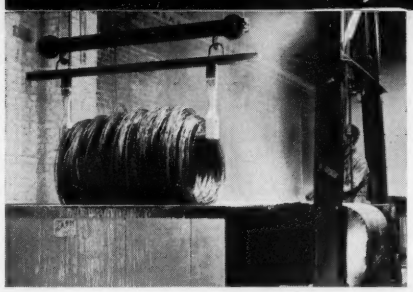
WORCESTER, H. M., JR., Chief Engr.,
Pacific Wire Rope Co.,
1840 E. 15th St., Los Angeles, Calif.

ZAPP, A. R., Manager,
Firthaloy Division,
Firth-Sterling Steel Co., McKeesport, Pa.

BROWN, RICHARD E., Execu. Secy.,
THE WIRE ASSOCIATION,
300 Main St., Stamford, Conn.

SPENGEL, R. S., Asst. Secy.,
THE WIRE ASSOCIATION,
300 Main St., Stamford, Conn.

MORRISON FLASH BAKERS



Save Time
Cut Costs
Speed Production

Fifty-three Morrison Flash Bakers now in operation in 29 plants are proving to wire manufacturers that their cost is an investment that pays dividends because of these operational features—

1—Space saving—size of a lime tank
2—Fit straight line or circle setups
3—Reduce cleaning house fog
4—Rust-free rod
5—High capacity
6—Acid brittleness recovery of about 95%
7—Rod remains on hook
8—Only a few minutes required for baking even fine wire

Descriptive Literature Sent on Request

MORRISON ENGINEERED
MORRISON ENGINEERING CORPORATION
5005 EUCLID AVENUE . . . CLEVELAND, OHIO
Associate Companies: MORRISON ENGINEERING OF CANADA, LTD. TORONTO, ONTARIO — CARRIER ENGINEERING CO., LTD. LONDON, ENGLAND

Model 4-SD-3 on New England Butt Braiders

Model SD Counters installed on Braiding Machines record production and establish a fixed cost of braiding per foot. Furnished with outside gearing as illustrated, or with internal gearing and flexible coupling for direct connection to capstan, and recording directly in feet.

Controlled Production

an essential in the Wire Industry

PRODUCTIMETERS installed on your production machines give accurate measurement throughout various wire processing . . . provide records for efficient scheduling and control. They are ruggedly built, precision designed to meet all-out production demands.

The line is complete . . . with models for different types of materials; capacities from 0" to 3½" diameter; speeds from 600 to 5000 feet per minute. Write our Engineering Department about your measuring problems.

Send for Catalog 3 for complete details!

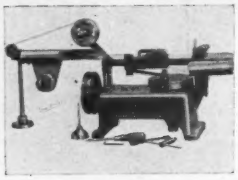
DURANT MANUFACTURING COMPANY

1918 N. Buffum St., Milwaukee 1, WIS. **PRODUCTIMETERS** 176 Eddy St., Providence 3, R. I.
THE SPEEDOMETERS OF INDUSTRY

WIRE CUTTING & SHAPING MACHINES

For Wire From .0005" to 1/16" and Flat Stock up to 1/8"

No. 111

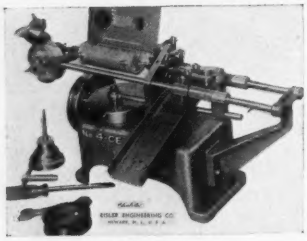


No. 4-E

Eisler fine wire cutting and forming machines have been in use over twenty-five years.

No. 111-H

SEND US YOUR SAMPLES



No. 4-CE

No. 111-AA

FOR INFORMATION WRITE

CHAS. EISLER

EISLER ENGINEERING CO.

747 South 13th St. (near Avon Ave.) Newark 3, N. J.

EISLER WIRE SHAPES

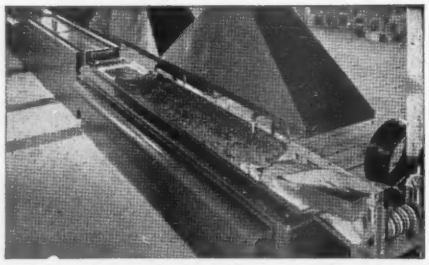
NEW — AND BETTER

The *Trauwood* PROCESS

PATENTING
TEMPERING
ANNEALING

OUTSTANDING ADVANTAGES

- Higher and more uniform physical and fatigue properties.
- No surface decarburization or scale. Faster wire speeds . . . greater production.
- Equipment fully automatic and easy to operate.
- Control of heating and cooling cycles extremely accurate.
- Thermal efficiency of the process very high.
- Much finer grained structure possible.
- High quenching temperatures rapidly attained.
- Adaptable to high alloy and austenitic steel wire and strip (annealing of stainless).



Trauwood Electric Wire Tempering and Patenting Unit

The Trauwood Process, new in principle, eliminates high temperature furnaces and lead pots with their excessive maintenance costs and low thermal efficiencies. More positive temperature control is possible and quenching is done in a RISING temperature—instead of falling, as in conventional heat treating methods. The rapid rate of heating (4 to 5 times as fast as furnace heating) increases production and uniformly produces a finer grained product with higher physical and fatigue values.

Wire and rod patented by the Trauwood Process insures easier drafting and makes heavier reductions possible. In conjunction with the Trauwood patenting equipment, pickling, coating and baking can be made continuous, eliminating expensive handling and delay, materially reducing costs as compared with ordinary methods.

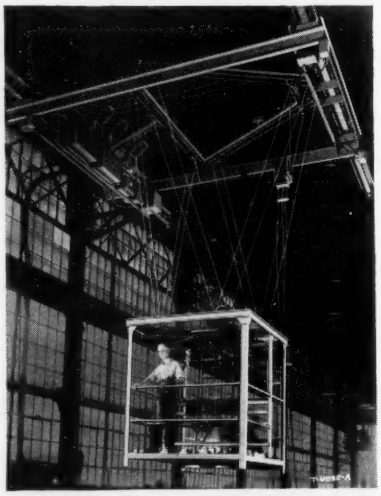
Complete details of the Trauwood Process will be furnished you on request. Our engineers will help you solve your continuous wire and strip patenting, tempering, and annealing problems. Write today.

THE TRAUWOOD ENGINEERING COMPANY

1740 E. 23rd STREET, CLEVELAND, OHIO, U.S.A.

Stabilized Traveling Platform Operates in Any Direction Without Swing

THE Cleveland Tramrail Division of The Cleveland Crane & Engineering Co., Wickliffe, Ohio, have developed a new Stabilized Traveling Platform that can be raised or lowered without swing as firmly as though held by verticale guides. It can be traveled to any point longitudinally or laterally in an area covered by the crane on which it is operated.



THIS platform was designed for spray painting large air cargo ships and to aid with some of the assembly operations. The floor area of the platform is divided into two sections: approximately one-third at the rear is for drums of paint and other equipment carried; the large space in front is for the painter's use.

✦ ✦ ✦

THREE master drum controllers are mounted on the railing at the rear of the painter's area, for operation of the hoist, bridge and trolley motions. Speeds may be varied with these controllers. Three sets of foot-operated controllers are also provided on the floor along the three outer sides of the painter's area. These enable the painter to move the platform to any location desired by use of controllers on the side of the platform that he is working from. They provide single slow speed motions convenient for spray painting.

Thus, the man's hands are free to perform his work without hindrance while operating the platform.

✦ ✦ ✦

BESIDES the usual upper limit switch for preventing the platform being hoisted beyond the upper limit, an important feature provided to aid safety when lowering, is the slack cable release. Through means of this feature, the platform is stopped immediately when lowering if any part of it comes in contact with any object sufficiently to cause slackening in any of the hoisting ropes.

✦ ✦ ✦

THE unit illustrated is of the all-welded steel construction. It will carry a load of 5 tons and has a hoisting speed of 18 f.p.m. This type of stabilized platform is suitable for operation through a verticale height up to 30 ft. and may be furnished for operation at any hoisting speed from creeping to 50 f.p.m., or more.

✦ ✦ ✦

APPLICATIONS where this can be used advantageously have been suggested for the steel, paper, textile and food industries.

✦ ✦ ✦

Fansteel Gets Second Army-Navy Production Award

FANSTEEL Metallurgical Corporation and Tantalum Defense Corporation of North Chicago were notified on June 1st by Robert P. Patterson, Under Secretary of War, that they both have been awarded their second Army-Navy Production Award. This gives both Corporations the privilege of adding the White Star to the Army-Navy "E" flag which they are now flying. The two firms received the original Army-Navy "E" Award August 19th, 1943.

✦ ✦ ✦

THE citation from Mr. Patterson stated that the second award was granted because "You have continued to maintain the highest standard that you set for yourselves and which won you distinction more than six months ago".

Callite fine wires

for springs, control cables, wire mesh sieves and instrument parts.

Meeting emergency schedules has not affected Callite Fine Wire *quality*. Drawn to optimum properties, our wires prove their mettle not only in production tests, but in performance.

We are constantly developing new types of wire for special purposes. Our experience in fine wire drawing over many years covers many industries. Often a suggestion from one of our engineers will help solve perplexing problems.

Consult us on wires for springs, instrument parts, control cables, bonding jumpers, wire mesh and sieves.

Callite Tungsten Corporation, 572 Thirty-ninth St., Union City, N. J. Branch Offices: Chicago, Cleveland.

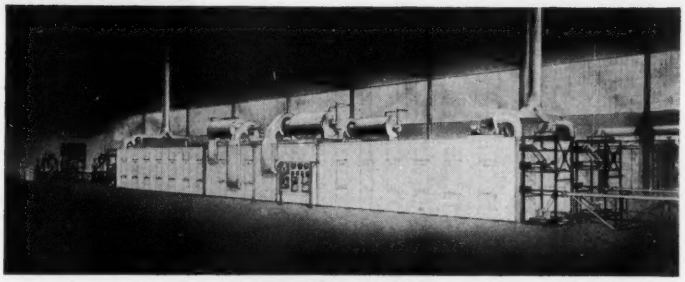
Callite fine wires

Precision diameters in Aluminum, Phosphor Bronze, Stainless Steel, Silver, Commercial Bronze, Everdur, Brasses, "Clad Wires", and special alloys. Prompt delivery in sizes down to .002", or smaller, cut to your exact specifications.

MORE PRODUCTION IN LESS TIME with CARL-MAYER FURNACES, OVENS

CARL-MAYER HI-SPEED ROD BAKER

The fastest rod baker built! Saves up to 50% in time and fuel. Patented Blow-Off Feature removes moisture without bumping or agitating the coils. Patented and patents pending.



WELDING ROD OVEN

For drying coated welding rods. Uses the "Mayer" Recirculating Gas Fired Air Heater principle and Rod Transfer Systems (patents pending).

Growing interest in our type of equipment is evidenced by Carl-Mayer installations in such plants as:—

Atlantic Wire Co.
Atlas Steel Co.
Eaton Mfg. Co.
Hollup Corp.
Johnson & Nephew Ltd.
Page Steel & Wire Co.
Pittsburgh Tool Steel Wire Co.
Steel Co. of Canada
Wickwire Spencer Steel Co.

WRITE FOR BULLETIN #241

THE CARL-MAYER CORPORATION 3030 EUCLID AVENUE CLEVELAND, OHIO

SUPER-HARD
TALIDE
DRAWING DIES
WITH TUNGSTEN CARBIDE NIBS OF EXCEPTIONAL DENSITY, STRENGTH AND HARDNESS . . . INSURE
● BETTER FINISH ● GREATER ACCURACY
● LONGER LIFE ● FEWER REJECTS
on Drawing and Extruding WIRE, RODS, BOLTS, RIVETS and TUBING
TALIDE DIES are manufactured in all standard round hole sizes from R-1 to R-18
SPECIAL SHAPE DIES
Oval, Square, Triangle, Hex etc., made to order
SHEET METAL DIES
extra large for deep drawing, cartridge cases, liners, and cans, are also made with TALIDE NIBS
FULL PARTICULARS ON REQUEST
WRITE OR WIRE TODAY!
METAL CARBIDES CORPORATION
YOUNGSTOWN, OHIO

WILLEY'S DIES LAST MUCH LONGER

SIZING, EXTRUSION and WIRE DRAWING DIES

Manufactured in all sizes, to meet your requirements, from a specially developed grade of Tungsten Carbide having freedom from porosity, exceptional abrasion resistance and the ability to take a polish equal to that of diamonds. Furnished in four classifications, (1) blank and rough cored nibs, (2) rough cored dies, (cased), (3) semi-finished, rough drilled dies, (cased), (4) finished dies, ready to use.

WRITE FOR CATALOG

WILLEY'S CARBIDE TOOL CO.
SOLE MAKERS OF WILLEY'S METAL
1342 W. Vernor Highway Detroit 1, Michigan

New Truck-Man Announced

A NEW Truck-Man, designed for moving skidded loads of one ton or under, has been announced. It introduces new features designed to provide safe, efficient moving of today's war materials and the materials of postwar tomorrow.

✦ ✦ ✦

EASIER, safer operation and greater flexibility have been built into the new, improved one-ton capacity Truck-Man, made by Yard-Man Inc., Jackson 86, Michigan.

✦ ✦ ✦

ONE of the important improvements is a patented two-speed drive which makes both a low and a high speed instantly available. The low speed is adapted for starting, climbing ramps, going in and out of freight cars or other tight places, and for moving material over rough floors. The Truck-Man turns in its own length. Steering has been improved by the use of a large ball thrust bearing which reduces steering effort.

✦ ✦ ✦

OPERATION has been made more dependable through the use of a new, more sensitive fly-ball type governor, which replaces the old pneumatic type. Other improvements include heavier load wheels with a four-inch tread and a larger gas tank of one gallon capacity which provides sufficient fuel for eight hours of normal operation. "V" type belt brakes automatically set when the machine is not in action.

✦ ✦ ✦

Bulletin Issued On Heat Exchangers

THE Niagara Blower Company, 6 East 45th Street, New York, 17, New York, has released a new bulletin describing a heat exchanger equipped with a "balanced wet bulb" temperature control, which is said to give constant and accurate control of temperature in liquids and gasses. Persons desiring a copy may secure it by asking for Bulletin 96, at the above address.

Book On Inspection

THE Chemical Publishing Co., Inc., 24 Court St., Brooklyn, N. Y., announces a new book "Engineering Inspection Practice" that will be ready on or about August 1st. The author is A. T. King, A.M.I.E.I.

✦ ✦ ✦

THIS is a complete guide to methods, gauges and instruments used in engineering production workshops, and is said to be clear enough to use as a text upon which to base a course in inspection practice.

✦ ✦ ✦

IT should be of particular value to the smaller manufacturer who is now using inspection methods previously employed by large concerns. It is also a good reference book for men engaged in inspection work or for those being trained for this vocation.

✦ ✦ ✦

BESIDES covering various kinds of inspection, like measuring screw threads, hardness testing, stress and strain and other types of testing, the various kinds of gauges, micrometers, and other measuring tools are described and illustrated.

✦ ✦ ✦

THE first five chapters are devoted to such subjects as reading working drawings, limits and tolerances, and the mathematics of inspection.

✦ ✦ ✦

PRICED at $3.00, the book contains 238 pages of text matter.

✦ ✦ ✦

New Booklet Describes Company's Activities

IN a new illustrated booklet describing the scope and achievements of the North American Philips Company, Inc., 100 East 42nd Street, New York, 17, N. Y., the products and facilities of the Company and its affiliates are described and illustrated.

(Please turn to Page 448)

APEX "PIC-KLEEN" PERFORMANCE DATA

(Case #22)

Type of Wire: 45 Carbon Signal Corps Wire
Speed: 1200 Feet per Minute
No. of Dies: 6
Drawn: Dry
Dies: Carbide
Reduction per Die: B & S
From: .072 to .031

Results: This Mill is producing, week in and week out an average of 75,000 # per week of fine quality wire for the Armed Forces, using Apex Pic-Kleen as the coating compound.

Conclusion: Production figures were only a fraction of the above until Pic-Kleen was employed to speed up essential production and increase die-life. We can probably improve *your* production likewise.

APEX ALKALI PRODUCTS COMPANY

MAIN AND RECTOR STREETS
PHILADELPHIA 27 PENNSYLVANIA

BOSTON, MASS. PITTSBURGH, PA. ATLANTA, GEORGIA
MERIDEN, CONN. DETROIT, MICHIGAN LOS ANGELES, CALIF.

Gilron

DRAW YOUR WIRE THE MODERN WAY with GILRON COATING COMPOUNDS

A big step forward in wire drawing. Thoroughly proven in mill practice. Makes possible wire drawing speeds heretofore considered impracticable. Increases die life, prevents scratching of wire, produces better finish and eliminates use of lime in many cases.

These coating compounds are of particular value in the more difficult operations—stainless, alloy, high carbon and welding rod wire. Multiple reductions can be drawn without re-coating.

Coatings for Drawing Stainless, Alloy, Low and High Carbon and Copper Coated Wires

Let us confer with you. Write or telephone for particulars.

GILRON PRODUCTS COMPANY

1559 EAST 40th STREET • CLEVELAND, OHIO

Telephone HEnderson 8375

NORBIDE TIPS

add

months of life

to gages used

for "Miking" Wire

NORBIDE contact points on micrometers will withstand severe and continuous usage in production work and always give remarkably long service. NORBIDE tips will outwear conventional micrometer tips many times, particularly where there is abrasive action as in gaging wire. NORBIDE is the trade name for Norton Boron Carbide, the hardest commercially-produced material.

N-62

NORTON COMPANY ● Worcester 6, Mass.

NORBIDE *ABRASIVE AND MOLDED PRODUCTS*

ROOS

POLISHERS-LAPPERS-GRINDERS

ROOS TOOL & MANUFACTURING CO.

17-19 GROVE STREET MONTCLAIR, NEW JERSEY

THE WIRE ASSOCIATION ANNUAL CONVENTION
will be held at the
WILLIAM PENN HOTEL PITTSBURGH, PA.
October 16-19 Inclusive

For Detailed Information Address
RICHARD E. BROWN, Executive Secretary
THE WIRE ASSOCIATION
300 MAIN ST. STAMFORD, CONN.

(Continued from Page 447)

THE book is intended to serve as a general introduction to the Company and its products, to tell something of what they are doing for the war effort and of what they hope to do for industry when peace comes.

✦ ✦ ✦

PERSONS desiring copies may secure them by writing direct to the Company.

✦ ✦ ✦

Oakite Holds Meeting for Technical Representatives

CONCURRENTLY in New York, Chicago and Los Angeles were held the Oakite Third War Production Conferences on cleaning, de-scaling, de-rusting, de-greasing and related production and maintenance operations. Participating with the entire Field Technical Service Representatives were the staffs of the Mechanical Engineering, Chemical and Research Laboratories and General Headquarters of Oakite Products, Inc.

✦ ✦ ✦

THESE sessions were devoted to the collating of field experience in order to determine the best and most practical methods for stepping up wartime production through speedier cleaning, due consideration being given to the shortage of manpower and time. Also discussed were concrete, workable techniques for prolonging equipment life; improving plant sanitation and maintenance; faster, more thorough cleaning in repair and overhaul procedures. Of particular interest to metalworking plants were the many new developments in Oakite materials either now available or shortly to be released.

✦ ✦ ✦

DATA and information resulting from the discussions held at the various meetings are available through the Oakite Technical Field Service.

Try This Proved Way to Get Cleaner Wire!

To get cleaner finished wire, immerse steel rods after pickling in recommended solution of Oakite Composition No. 24.

Because this specially designed material removes smut and other foreign matter speedily and completely, wire is cleaner for lime coating. Moreover, a heavier, more adherent lime coat is obtained. Improved lubrication results. In addition, Oakite Composition No. 24 helps you reduce baking time. Write us today for further data . . . without obligation, of course!

OAKITE PRODUCTS, INC.
52A THAMES ST., NEW YORK 6, N. Y.
Technical Service Representatives Located in All Principal Cities of the United States and Canada

OAKITE
MATERIALS . . . METHODS . . . SERVICE
Buy Bonds for Victory

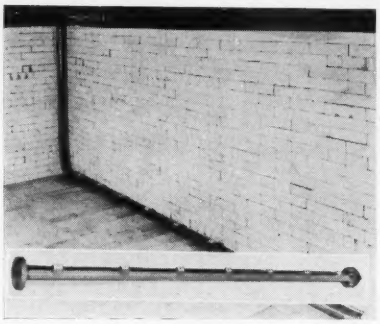
ACID AND ALKALI PROOF
LININGS AND MORTARS

ACID PROOF
CONSTRUCTION

THE CEILCOTE CO.
Consulting and Research Engineers
750 ROCKEFELLER BLDG.
CLEVELAND, OHIO

Jet Agitator for Heating Acid Tanks

THE Heil Engineering Company, 12901 Elmwood Avenue, Cleveland, has developed a new type of steam jet for tank processing of bar metals, wire, and continuous sheet or strip, furnished in flanged sections which can be



coupled together to provide any desired length, and to extend the agitating and heating effect to any part of a tank.

✦ ✦ ✦

DESIGNED to speed pickling or processing and to provide more complete agitation and more uniform heating, this jet can be adapted to square, rectangular or round tanks. Boiling temperatures can be attained, at which these rugged jets will give unusually long service. Sections are usually made in lengths of about 10 feet, and are coupled with lead bolts, with a blind flange to close the open end. Nozzles are spaced along the tank bottom on 15″ centers unless otherwise specified by the user.

✦ ✦ ✦

THE series of nozzles along the entire length of the tank creates a rolling, agitating effect similar to a barrel roll, causing the liquid to circulate above and around the parts immersed. The effect is increased by placing jets on either side or all around the bottom of the tank, with nozzles set at angles to produce the maximum rolling effect. The nozzle used is a patented device with an orifice of graphitic carbon, which is unaffected by the corrosive attack of most chemical solutions.

(Please turn to Page 450)

WIRE CUTTING MADE EASY

Hard wire*, spring wire, as well as soft wire, wire fabric, tie wire, fencing, etc. — easily and quickly cut with a porter tool. A standard model for average needs. Special models for special work.

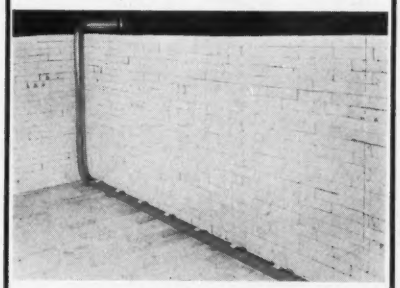
Send for catalog showing all Porter models of wire cutters, bolt clippers, etc.

(with center cut round edge jaws)

H. K. PORTER, INC.
EVERETT 49, MASS., U.S.A.

PORTER HKP CUTTERS

FASTER PICKLING, UNIFORM RESULTS



With HEIL E-3 JETS!

The new HEIL E-3 steam jets for wire, strip, and continuous sheet provide complete agitation and uniform heating for the entire tank. Supplied in single units or in 10-foot flanged sections for *any* length tank. Made of heavy extruded lead alloys, with Nocorodal nozzle orifices, unattacked by most chemical solutions.

FREE!

Send today for this new steam jet bulletin.

HEIL ENGINEERING CO.
12908 ELMWOOD AVE., CLEVELAND 11, OHIO

STEELSKIN

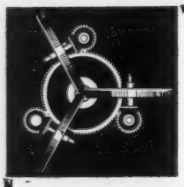
REG. U. S. PAT. OFFICE

For High or Low Carbon Wire

WIRE, TUBING, STAMPING, DEEP DRAWING SOAPS and COMPOUNDS

Established 32 years

R. H. MILLER CO., Inc. **Homer, N. Y.**



WIRE MEASURING MACHINE

FOR LINEAR MEASURE

PROVIDES NEW STANDARD OF ACCURACY

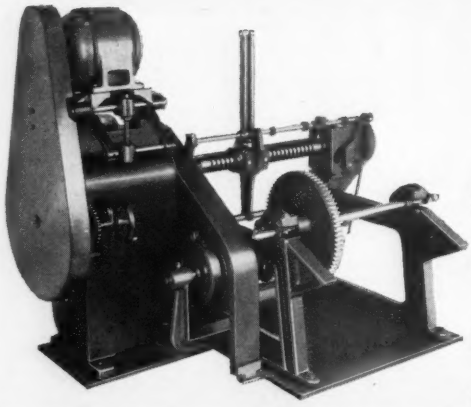
Illustration Shows Exclusive Patented "3V" Principle

Measuring twisted, armored, bare or insulated wire without vibration or inaccuracies at any speed or varying speeds!

Write for Information and Prices

LYON-VAIL MACHINE CO., INC.

97 Belmont Street, BROCKTON, Massachusetts



MOTORIZED TAKE UP

NEBUTTCO

With variable speed transmission and adjustable automatic traverse motion.

Motor on hinged base with adjustment for tightening belt drive to speed transmission.

Built to suit customers' reels.

NEW ENGLAND BUTT CO.

304 PEARL ST.

PROVIDENCE 7, R. I., U. S. A.

NIAGARA Aero HEAT EXCHANGER

Saves cooling water cost, saves equipment, saves power. Controls temperature of Wire Drawing Compounds, Industrial Liquids, Quenching Baths, Jacket Water, Lubricating Oils.

Write for Bulletins 90 & 94

NIAGARA BLOWER COMPANY

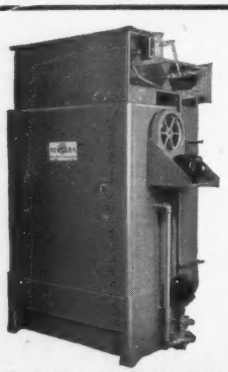
General Sales Office: 6 E. 45th St., New York 17, N. Y.

37 W. Van Buren St., Chicago 5, Ill.

Fourth & Cherry Bldg., Seattle 4, Wash.

673 Ontario St., Buffalo 7, N. Y.

SALES ENGINEERS IN PRINCIPAL CITIES



U. S. Patent Nos. 2,296,946 and 2,321,933

(Continued from Page 449)

SEVERAL modifications of this same style jet are available. These have been developed for batch processing.

✦ ✦ ✦

THE jets are furnished with a steam flange and bolts to connect to a standard 6″ O.D. flange reduced for 1″ steam supply line. The recommended steam pressure is 80 pounds, although a maximum pressure of 125 pounds may be used. It is possible to use air steadily or intermittently along with steam to produce greater agitation, and in some cases this has been found desirable.

✦ ✦ ✦

THIS company has just issued a bulletin describing various steam jets.

✦ ✦ ✦

Two New Bulletins

THE American Chemical Paint Co., Ambler, Pa., has issued a new technical service data sheet on Solvent No. 3, which is a liquid chemical, which when added to hot caustic solutions, speeds the removal of paints, lacquers and enamels, increasing the effectiveness of the stripping operation. The sheet describes the conditions under which it is used, the equipment required and gives directions concerning its proper use. This is Data Sheet No. 14-2-3-2.

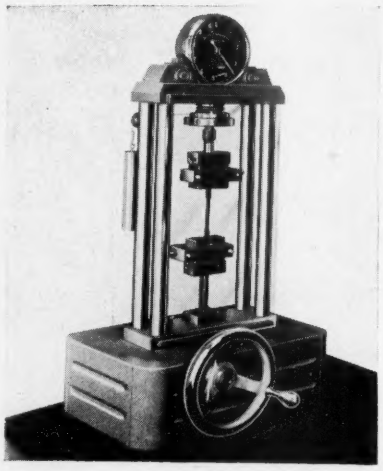
✦ ✦ ✦

ANOTHER bulletin gives additional information on Cuprodine, their copper coating for steel that serves as a metallic lubricant in drawing wire. This is applied without the use of electric current. This bulletin and a technical data sheet covering Cuprodine may be had upon request.

The 1944 Convention of the Wire Association will be held at PITTSBURGH, PA. October 16-19 Inclusive

New Bulletin Describes Tensile Tester

W. C. DILLON & CO., 5410 West Harrison Street. Chicago, 44, Illinois, recently issued a new folder describing this line of testers, which come in six sizes ranging from 0 to 250 lbs. to 0 to 10,000 lbs.



THE major portion of the booklet is devoted to their Model "K" and its accessories, which is described as "a precision machine for precision testing". The machine can be used as a portable tester, or mounted on a heavy welded metal base, and is made in standard size or in an extra tall model.

✦ ✦ ✦

ATTACHMENTS include standard gripping jaws, a variety of jaws for gripping flat wire, wire rope, etc., a cage for compression testing and a fixture for transverse testing. The testers may be operated by hand or can be motorized through the addition of equipment that may be attached to the floor stand or metal base. Specifications, prices and other information are given.

✦ ✦ ✦

IF interested in securing this folder, please ask the Company for Bulletin No. 141W.

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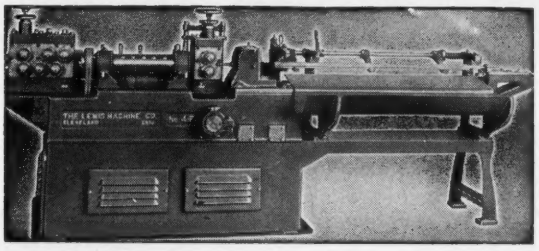

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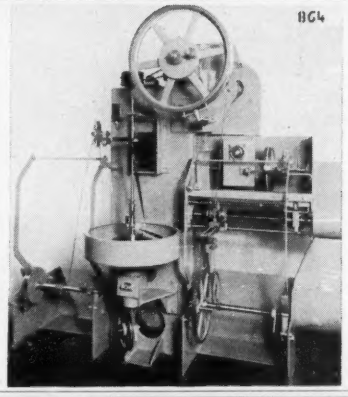

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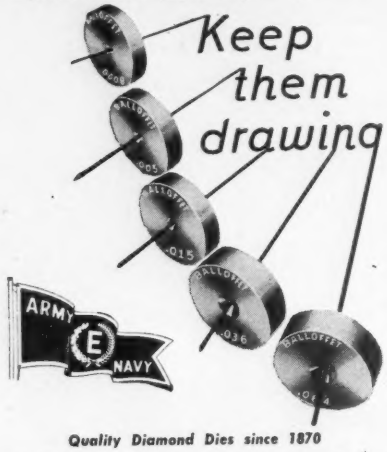

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Producing New Plastic

THE B. F. Goodrich Rubber Company has placed on the market a new group of polyvinol resins under the trade name "GEON", which can be calendered, extruded, molded, cast or applied to other materials.

✦ ✦ ✦

THESE plastics are suited to use as insulating coatings for electric wire and cable and are said to have high resistance to heat and light and to have great tensile strength and high dielectric qualities. Besides its use in the wire industry, "GEON" has a long list of other industrial applications. While ordinarily thermo-plastic, it can be vulcanized in combination with certain thermo-plastic settings. For further information, address the Company at 500 South Main Street, Akron, Ohio.

✦ ✦ ✦

Now Producing Drums for Reels At Garrett, Ind.

FLANGED steel traverses or drums for reels and fluted type steel shipping reels for steel wire, wire rope and the copper cable and wire industries are now being produced by the Garrett Division of the Hubbard Spool Company. This new plant is located at Garrett, Indiana.

✦ ✦ ✦

THE traverse is made for all types of reels — in standard sizes available in widths and diameters ranging from 6″ to 60″. May be ordered in plain, painted or

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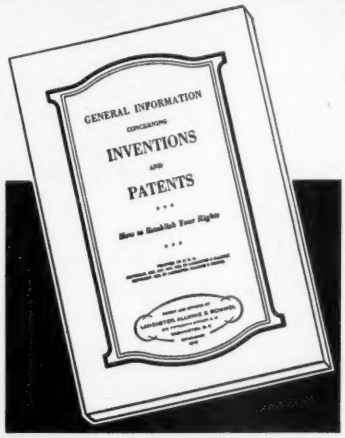

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SHELL

hot dipped galvanized finish according to requirements. Traverses and reels are manufactured under a license arrangement with Western Electric Company, Inc.

✦ ✦ ✦

IN addition to being ideally located for shipment to all wire mills, this new plant is well equipped to handle orders for special size traverses or drums. It places at the disposal of the user more than 32 years' experience in the fabrication and development of wire spools and reels. Requests for further information concerning prices, delivery, etc. should be addressed to the Hubbard Spool Company, Garrett Division, 1622 Carroll Avenue, Chicago (12) Illinois.

✦ ✦ ✦

A Review of Recent Wire Patents

(Continued from page 439)

R. Kemp, Westwood, N. J., assignors to Bell Telephone Laboratories, Incorporated, New York, N. Y., a corporation of New York.

The first of these cover an abrasive-resistant covering for the conductor and the other a conductor capable of being soldered without stripping the insulation thereon.

✦ ✦ ✦

No. 2,350,023, LAPPING MACHINE FOR WIRE-DRAWING DIES, patented May 30, 1944 by Otis G. Ferrier, Fort Wayne, Ind.

Arrangement of parts is such that the swing of the arbor-carrying carriage is increased or decreased according to adjustment of the carriage relative to an eccentric.

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(Case #52)
Type of Wire: Copper-nickel alloy.
Speed: 2200 ft./min.
Reduction: .025 to .0063.
No. of Dies: 12
Drawn: Wet
Dies: Diamond
Results: Production figures on the finishing die jumped from a two-numbered figure to several thousand, through the use of Apex "Draw-Alloy". Quoting the wire-mill supt. verbatim: "We are obtaining unheard of results with Apex 'Draw-Alloy'."
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13 models in both segment and clutch types for rapid, automatic, accurate production using wire diameters .003" to .500". Torsion and other attachments available for increasing utility of Torrington Coilers.
The TORRINGTON
MANUFACTURING CO.
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Electric Equipment for Wire Drawing Machines

(Continued from Page 424)

steps of dynamic braking. Since the rider roll rheostat has control of individual motor speed during deceleration, however, a common dynamic braking resistor for all motors will provide suitable operation in most cases.

6) Quick stopping of the drive to be provided on operation of any one of the following control devices:
   - A) Shipper rod moved to "stop" position.
   - B) Safety loop or snarl switch.
   - C) Back guard safety switch.
   - D) Broken wire limit switch on last rider arm.
   - E) Any field protective relay, overload relay, or d-c undervoltage.
   - F) A-c undervoltage, indicating possible loss of blower motor power.

✦ ✦ ✦

Hubbard Spool Company Gets Army-Navy "E" Award

ON June 19th the Hubbard Spool Company, 1622 Carroll Avenue, Chicago, Illinois, were presented with the coveted Army-Navy "E" Award for high production achievement.

✦ ✦ ✦

THIS well-earned award was made with appropriate ceremonies at the Company's offices and plant on Carroll Avenue, where besides making some special equipment for the armed forces, they manufacture wire drawing, annealing and shipping spools and reels. Through the Garrett Division, they also make drums and traverses for all types of reels.

✦ ✦ ✦

Coating Compounds — Their Capabilities and Functions

(Continued from Page 418)

THE entire field open to coating compounds or some comparable material is certainly one broad enough, wide enough and interesting enough to challenge the thought and ability and ingenuity of any or all of us who are now engaged in this most interesting phase of more efficient wire production.

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7—Waterbury Step Cone Wire Drawing Machines
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6—Lewis Welding Wire S. & C. Machines M. D.
2—Shuster Shaped Wire S. & C. Machines ½" & ⅞" Square, Hexagon & Round Stock Capacities
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for the Wire and Wire Products Industry

Wickwire Spencer Steel Promotes McCarthy and Gordon

MR. R. T. Dunlap, Vice President in Charge of Production of the Wickwire Spencer Steel Company, has announced the promotion of Mr. B. L. McCarthy to the position of Assistant General Superintendent of the Buffalo Plant. Also announced was the appointment of Mr. C. A. Gordon to the position of Superintendent of Hot Departments at the Buffalo Plant.

✦ ✦ ✦

MR. McCarthy was previously Chief Metallurgist of Wickwire Spencer and is well known in the industry as a chemist and for outstanding contributions to the study of steel metallurgy.

✦ ✦ ✦

MR. Gordon has a long record in the steel industry for operating efficiency for open hearth and hot mill management.

✦ ✦ ✦

BOTH Mr. McCarthy and Mr. Gordon will be located at the Company's Buffalo Plant, River Road, Buffalo, New York.

✦ ✦ ✦

Brown Made General Manager of Huntington Works

HERMAN M. BROWN has been appointed general manager of the Huntington Works of International Nickel Co. Inc., New York, succeeding **Arthur S. Shoffstall,** retired. Mr. Shoffstall will continue as consultant to the head office of the company. **John A. Marsh** succeeds Mr. Brown as assistant general manager, Huntington Works.

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Machinery For
Wire, Tube, and Brass Mills
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Index To Advertisers

A

Ajax Industrial Supplies, Inc. 453
American Chemical Paint Co. 399
American Insulating Machinery Co. 451
Apco Mossberg Co. 451
Apex Alkali Products Co. 447-453

B

Balloffet Dies & Nozzle Co., Inc. 452
Bethlehem Steel Co. 398
Bick, Hans C., Inc. 454
Brewer Mfg. Co. 454
Broden Construction Co., The ..... Inside Front Cover

C

Callite Tungsten Corp. 445
Carboloy Company, Inc. 428-429
Carl-Mayer Corp., The 445
Ceilcote Company, The 449
Cheney Bros. 397
Cleveland Tramrail Div. of Cleveland Engineering Co. 455
Couchaud Wire Die Corp. 452
Continental Steel Corp. 401
Crepe-Kraft Co., The 455

D

Davis, R. L., Electric Co. 442
Durant Mfg. Co. 443

E

Eisler Engineering Co. 444
Electric Furnace Company ..... Back Cover
Emory, Robert J., Co. 455

F

Fidelity Machine Co. 455
Firth-Sterling Steel Co. 414
Fort Wayne Wire Die, Inc. 452
Franklin Steel & Wire Co. 454

G

Gilron Products Co., Inc. 447
Glader, Wm., Machine Works 435

H

Hartley, Geo. D. 454
Haveg Corp. 440
Heil Engineering Co. 449
Hubbard Spool Company 439
Hudson Wire Co. ..... Inside Back Cover

I

Indiana Wire Die Co. 452
Industrial Oven Eng. Co. 436

J

Jersey Steel & Wire Corp. 454
Jones & Laughlin Steel Corp. 403

K

Keagler Brick Co. 455
Kelly Wire Die Corp. 452
Keystone Steel & Wire Co. 434

L

Lancaster, Allwine & Rommel 453
Lewis, K. B. 454
Lewis Machine Co., The 451
Luginbill Wire Die Co. 453
Lyon-Vail Machine Co., Inc. 450

M

Magnus Chemical Co. 400
Metal Carbides Corporation 446
Michigan Wire Die Co. 453
Micro Products Co. 433
Miller, R. H., Co., Inc. 450
Morgan Construction Co. 412
Morrison Engr. Corp. 443
Moslo Machinery Co. 455
Mossberg Pressed Steel Corp. 455

N

National Annealing Box Co. 455
National Machinery Exchange 454
New England Butt Co. 450
Niagara Blower Company 450
Nilson, A. H., Machine Co. 442
Norton Company 448
Nukem Products Co. 455

O

Oakite Products, Inc. 449
O'Neil-Irwin Mfg. Co. 455

P

Parkin, Wm. M., Co. 455
Pennsylvania Industrial Engineers 454
Pittsburgh Steel Co. 410
Plastics Div. of Carbide & Chemicals Corp. 425
Platt Bros. & Co., The 454
Porter, H. K., Inc. 449
Potter, Neil C. 453

R

Robertson, John, Co., Inc. 406
Rockwell, W. S., Co. 455
Roos Tool & Mfg. Co. 448
Ross, J. O., Engineering Corp. 455
Royle, John, & Sons 404
Ruesch, H. J., Machine Co. 455
Rusch Wire Die Corp. 452

S

Sauereisen Cements Co. 455
Scott, Henry L., Co. 454
Scudder, E. J., Foundry & Machine Co. 455
Shell Oil Co. 453
Sleeper & Hartley, Inc. 419
Standard Industrial Compounds Co. 405
Standard Machinery Company 402
Stevens Metal Products Co., The 413
Surface Combustion Div. of General Properties Co., Inc. 455
Syncro Machine Co. 411

T

Torrington Mfg. Co., The 454
Trauwood Engineering Co. 444
Tungsten Electric Corp. 437

V

Vascoloy-Ramet Corp. 408
Vaughn Machinery Co. ..... Front Cover
Vianney Wire Die Works 452

W

Waterbury-Farrel Fdry. & Machine Co. 409
Watson Machine Co. 438
Wayne Wire Die Co. 452
Wickwire Spencer Steel Co. 407
Willey's Carbide Tool Co. 446
Wilson, Lee, Engr. Company 455
Wopis Industry Lab. 453

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Morgan Construction Co., Worcester, Mass.
Morrison Engr. Corp., Cleveland, Ohio
Moslo Machinery Co., Cleveland, Ohio.
Ross, J. O., Engineering Corp., New York, N. Y.

BELTS—Wire
Wickwire Spencer Steel Co., New York, N. Y.

BENDERS—
O'Neil-Irwin Mfg. Co., Minneapolis, Minn.

BOBBINS—Braider and Wire Weaving
Apco Mossberg Co., Attleboro, Mass.
Hubbard Spool Co., Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.

BORON CARBIDE—
Norton Co., Worcester, Mass.

BRAKES & SHEARS—
O'Neil-Irwin Mfg. Co., Minneapolis, Minn.

BRICKS—Acid Proof
Keagler Brick Co., Steubenville, Ohio.

CABLE LACQUERING OVENS
Industrial Oven Engr. Co., Cleveland, Ohio.

CABLE—Steel and Copper
Brewer Mfg. Co., Muncy, Pa.

CARRIERS—Braider, High Speed
Apco Mossberg Co., Attleboro, Mass.
Mossberg Pressed Steel Corp., Attleboro, Mass.
New England Butt Co., Providence, R. I.

CASTINGS—Wire Mill
Scudder, E. J., Fdry. & Machine Co., Trenton, N. J.

CEMENTS—Acid Proof
Saucreisen Cement Co., Pittsburgh, Pa.

CEMENTS—Refractory
Norton Co., Worcester, Mass.

CHEMICALS—Cleaning
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Oakite Products, Inc., New York, N. Y.
Parkin, Wm. M. Co., Pittsburgh, Pa.
Standard Industrial Compounds Co., Chicago, Ill.

CLEANERS—Hand and Metal
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Magnus Chemical Co., Garwood, N. J.
Oakite Products, Inc., New York, N. Y.
Standard Industrial Compounds Co., Chicago, Ill.

CLEANING & PICKLING EQUIPMENT—
Broden Construction Co., Cleveland, O.
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, Ohio.
Haveg Corporation, Newark, Del.
Morgan Construction Co., Worcester, Mass.
Nukem Products Corp., Buffalo, N. Y.
Vaughn Machinery Co., Cuyahoga Falls, O.
Wilson, Lee, Engr. Co., Cleveland, Ohio

CLOTH TESTERS—
Scott, Henry L., Co., Providence, R. I.

CLOTH—Wire, All Metals
Callite Tungsten Corp., Union City, N. J.
Wickwire Spencer Steel Co., New York, N. Y.

COATING COMPOUNDS—
Apex Alkali Products Co., Philadelphia, Pa.
Gilron Products Co., Cleveland, Ohio
Magnus Chemical Co., Garwood, N. J.
Miller, R. H., Co., Inc., Homer, N. Y.
Oakite Products, Inc., New York, N. Y.
Standard Industrial Compounds Co., Chicago, Ill.

COILERS—Sheet, Strip and Wire
Broden Construction Co., Cleveland, O.
Ruesch, H. J., Machine Co., Newark, N. J.
Torrington Mfg. Co., Torrington, Conn.

COLD HEADERS—
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn

COMPOUNDS—Coppering
American Chemical Paint Co., Ambler, Pa.

COMPOUNDS—Metal Finishing
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.

COMPOUNDS—Rust Preventing
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Oakite Products, Inc., New York, N. Y.

COMPOUNDS—Rust Removing
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Oakite Products, Inc., New York, N. Y.

COMPOUNDS—Wire Drawing
Apex Alkali Products Co., Philadelphia, Pa.
Gilron Products Co., Cleveland, Ohio.
Miller, R. H., Co., Inc., Homer, N. Y.
Oakite Products, Inc., New York, N. Y.
Potter, Neil C., Newark, N. J.
Shell Oil Co., New York, N. Y.
Standard Industrial Compounds Co., Chicago, Ill.

CONTROLS—Heat Treating
Niagara Blower Co., Buffalo, N. Y.

COPHOLDERS—Steel
Apco Mossberg Co., Attleboro, Mass.
Hubbard Spool Co., Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.

CRANES—Wire Mill
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, Ohio.
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

CUTTING TOOLS—Carbide
Carboloy Co., Inc., Detroit, Mich.
Firth-Sterling Steel Co., McKeesport, Pa.
Metal Carbides Corp., Youngstown, Ohio.
Vascoloy-Ramet Corp., North Chicago, Ill.

CUTTING TOOLS—Wire
Porter, H. K., Inc., Everett, Mass.

DIAMONDS—Industrial
Balloffet Dies & Nozzle Co., Inc., Guttenberg, N. J.
Callite Tungsten Corp., Union City, N. J.
Michigan Wire Die Co., Detroit, Mich.
Rusch Wire Die Corp., New York, N. Y.
Vianney Wire Die Wks., New York, N. Y.

DIAMOND POWDERS—
Michigan Wire Die Co., Detroit, Mich.
Rusch Wire Die Corp., New York, N. Y.

DIAMOND TOOLS—
Rusch Wire Die Corp., New York, N. Y.

DIE MAKING MACHINERY — For Forming Special Shapes
O'Neil-Irwin Mfg. Co., Minneapolis, Minn.

DIES—Diamond
Ajax Industrial Supplies, Inc., Fort Wayne, Ind.
Balloffet Dies & Nozzle Co., Inc., Guttenberg, N. J.
Cochaud Wire Die Corp., New York, N. Y.
Fort Wayne Wire Die, Inc., Fort Wayne, Ind.
Indiana Wire Die Co., Fort Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
Luginbill Wire Die Co., Fort Wayne, Ind.
Michigan Wire Die Co., Detroit, Mich.
Rusch Wire Die Corp., New York, N. Y.
Vianney Wire Die Works, New York, N. Y.
Wayne Wire Die Co., Hillside, N. J.

DIES—Eyelet
Metal Carbides Corp., Youngstown, Ohio.

DIES—Lead Extrusion
Robertson, John, Co., Brooklyn, N. Y.

DIES—Repairs & Re-Cutting
Ajax Industrial Supplies Co., Fort Wayne, Ind.
Balloffet Dies & Nozzle Co., Inc., Guttenberg, N. J.
Carboloy Co., Inc., Detroit, Mich.
Cochaud Wire Die Corp., New York, N. Y.
Firth-Sterling Steel Co., McKeesport, Pa.
Fort Wayne Wire Die, Inc., Fort Wayne, Ind.
Indiana Wire Die Co., Fort Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
Luginbill Wire Die Co., Fort Wayne, Ind.
Metal Carbides Corp., Youngstown, Ohio.
Rusch Wire Die Corp., New York, N. Y.
Vascoloy-Ramet Corp., North Chicago, Ill.
Vianney Wire Die Works, New York, N. Y.
Wayne Wire Die Co., Hillside, N. J.
Willey's Carbide Tool Co., Detroit, Mich.

DIES—Rod and Tube Drawing
Balloffet Dies & Nozzle Co., Inc., Guttenberg, N. J.
Carboloy Co., Inc., Detroit, Mich.
Firth-Sterling Steel Co., McKeesport, Pa.
Kelly Wire Die Corp., New York, N. Y.
Metal Carbides Corp., Youngstown, Ohio.
Michigan Wire Die Co., Detroit, Mich.
Rusch Wire Die Corp., New York, N. Y.
Tungsten Electric Corp., Union City, N. J.
Vascoloy-Ramet Corp., North Chicago, Ill.
Vianney Wire Die Works, New York, N. Y.
Willey's Carbide Tool Co., Detroit, Mich.

DIES—Tantalum Carbide
Balloffet Dies & Nozzle Co., Inc., Guttenberg, N. J.
Carboloy Co., Inc., Detroit, Mich.
Firth-Sterling Steel Co., McKeesport, Pa.
Kelly Wire Die Corp., New York, N. Y.
Rusch Wire Die Corp., New York, N. Y.
Vascoloy-Ramet Corp., North Chicago, Ill.
Vianney Wire Die Works, New York, N. Y.
Willey's Carbide Tool Co., Detroit, Mich.

DIES—Tungsten Carbide
Balloffet Dies & Nozzle Co., Inc., Guttenberg, N. J.
Carboloy Co., Inc., Detroit, Mich.
Firth-Sterling Steel Co., McKeesport, Pa.
Kelly Wire Die Corp., New York, N. Y.
Metal Carbides Corp., Youngstown, Ohio.
Michigan Wire Die Co., Detroit, Mich.
Rusch Wire Die Corp., New York, N. Y.
Tungsten Electric Corp., Union City, N. J.
Vascoloy-Ramet Corp., North Chicago, Ill.
Vianney Wire Die Works, New York, N. Y.
Willey's Carbide Tool Co., Detroit, Mich.
Wopis Industry Laboratory, Brooklyn, N. Y.

DIRECT ELECTRIC RESISTANCE HEATING—
Trauwood Engr. Company, Cleveland, Ohio

DRAW BENCHES—
Ruesch, H. J., Machine Co., Newark, N. J.
Scudder, E. J., Foundry & Machine Co., Trenton, N. J.
Standard Machinery Co., Providence, R. I.
Vaughn Machinery Co., Cuyahoga Falls, O.

DRUMS—Flange Steel
Stevens Metal Products Co., Niles, O.

DRUMS—Vulcanizing
Mossberg Pressed Steel Corp., Attleboro, Mass.

DRYING AND PRE-HEATING ROOMS—
Industrial Oven Engr. Co., Cleveland, O.

DRYING EQUIPMENT—
Niagara Blower Co., Buffalo, N. Y.
Ross, J. O., Engr. Corp., New York, N. Y.

ENGINEERS—Consulting Wire Mill
Hartley, George D., Worcester, Mass.
Lewis, Kenneth B., Worcester, Mass.

EQUIPMENT—Humidifying
Niagara Blower Co., Buffalo, N. Y.

EQUIPMENT—Insulation Testing
Davis, R. L., Electric Co., Wallingford, Conn.

EYELETS—Brass or Zinc
Platt Bros. & Co., The, Waterbury, Conn.

FENCES AND FENCING—Wire
Wickwire Spencer Steel Co., New York, N. Y.

FLASH BAKER—
Morrison Engr. Corp., Cleveland, Ohio

FLUXES—Soldering
American Chemical Paint Co., Ambler, Pa.

FOAM PRODUCING COMPOUNDS—
American Chemical Paint Co., Ambler, Pa.
Parkin, Wm. M. Co., Pittsburgh, Pa.

FRICTION PAY-OFF STANDS—
Industrial Oven Engr. Co., Cleveland, O.

FURNACES—Annealing
Carl-Mayer Corp., The, Cleveland, Ohio.
Electric Furnace Co., Salem, O.
Morrison Engr. Corp., Cleveland, Ohio
Rockwell, W. S., Co., New York, N. Y.
Surface Combustion, Div. of General Properties Co., Inc., Toledo, Ohio.
Trauwood Engr. Company, Cleveland, Ohio
Wilson, Lee, Engr. Co., Cleveland, Ohio

WHERE TO BUY, Continued

FURNACES—Automatic
Carl-Mayer Corp., The, Cleveland, Ohio.
Electric Furnace Co., Salem, O.
Morrison Engr. Corp., Cleveland, Ohio
Rockwell, W. S., Co., New York, N. Y.
Surface Combustion, Div. of General Properties Co., Inc., Toledo, Ohio.
Wilson, Lee, Engr. Co., Cleveland, Ohio

FURNACES—Brazing
Electric Furnace Co., Salem, O.
Firth-Sterling Steel Co., McKeesport, Pa.

FURNACES—Bright Annealing
Electric Furnace Co., Salem, O.
Rockwell, W. S., Co., New York, N. Y.
Surface Combustion, Div. of General Properties Co., Inc., Toledo, Ohio.
Wilson, Lee, Engr. Co., Cleveland, Ohio

FURNACES—Electric
Eisler Engineering Co., Newark 3, N. J.
Electric Furnace Co., Salem, Ohio
Rockwell, W. S., Co., New York, N. Y.
Surface Combustion, Div. of General Properties Co., Inc., Toledo, Ohio
Trauwood Engr. Co., Cleveland, Ohio

FURNACES—Hardening & Tempering
Carl-Mayer Corp., The, Cleveland, Ohio
Electric Furnace Co., Salem, Ohio
Morrison Engr. Corp., Cleveland, Ohio
Rockwell, W. S., Co., New York, N. Y.
Surface Combustion, Div. of General Properties Co., Inc., Toledo, Ohio
Trauwood Engr. Co., Cleveland, Ohio

FURNACES—Lead Melting
Electric Furnace Co., Salem, Ohio
Robertson, John, Co., Brooklyn, N. Y.
Rockwell, W. S., Co., New York, N. Y.
Surface Combustion, Div. of General Properties Co., Inc., Toledo, Ohio

FURNACES—Non-Oxidizing
Carl-Mayer Corp., The, Cleveland, Ohio
Electric Furnace Co., Salem, Ohio
Morrison Engr. Corp., Cleveland, Ohio
Rockwell, W. S., Co., New York, N. Y.
Surface Combustion, Div. of General Properties Co., Inc., Toledo, Ohio

FURNACES—Normalizing
Carl-Mayer Corp., The, Cleveland, Ohio
Electric Furnace Co., Salem, Ohio
Morrison Engr. Corp., Cleveland, Ohio
Rockwell, W. S., Co., New York, N. Y.
Surface Combustion, Div. of General Properties Co., Inc., Toledo, Ohio.

FURNACES—Salt Bath
Electric Furnace Co., Salem, Ohio
Surface Combustion, Div. of General Properties Co., Inc., Toledo, Ohio.

FURNACES—Wire, Strip & Sheet
Carl-Mayer Corp., The, Cleveland, Ohio
Eisler Engineering Co., Newark 3, N. J.
Electric Furnace Co., Salem, Ohio
Morrison Engr. Corp., Cleveland, Ohio
Rockwell, W. S., Co., New York, N. Y.
Surface Combustion, Div. of General Properties Co., Inc., Toledo, Ohio.
Wilson, Lee, Engr. Co., Cleveland, Ohio

GALVANIZING EQUIPMENT—
Wilson, Lee, Engr. Co., Cleveland, Ohio

GALVANIZING KETTLES—
National Annealing Box Co., Washington, Penna.

GRINDERS—Roll
Norton Co., Worcester, Mass.

HI-SPEED BAKERS—
Carl-Mayer Corp., The, Cleveland, Ohio

HOISTS—Electric Travelling
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, O.

INHIBITORS—
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Oakite Products, Inc., New York, N. Y.
Parkin, Wm. M. Co., Pittsburgh, Pa.

INSULATION LACQUERING SYSTEMS—Continuous
Industrial Oven Engr. Co., Cleveland, O.

INSULATING MATERIALS — For Electric Wire and Cable
Carbide & Carbon Chemicals Corp., Plastics Div., New York, N. Y.

KETTLES—Galvanizing, Annealing, Tinning, etc.
National Annealing Box Co., Washington, Penna.

LATHES—Die Reaming
Carboloy Co., Inc., Detroit, Mich.
Firth-Sterling Steel Co., McKeesport, Pa.
Morgan Construction Co., Worcester, Mass.
Roos, H. & G., Tool & Mfg. Co., Montclair, N. J.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Fdry & Machine Co., Waterbury, Conn.

LININGS—Acid and Alkali Proof
Ceilcote Co., The, Cleveland, Ohio

LUBRICANTS—For Metal Cutting, Stamping and Drawing
Apex Alkali Products Co., Philadelphia, Pa.
Magnus Chemical Co., Garwood, N. J.
Miller, R. H., Co., Inc., Homer, N. Y.
Oakite Products, Inc., New York, N. Y.
Standard Industrial Compounds Co., Chicago, Ill.

LUBRICANTS—Wire Drawing
Apex Alkali Products Co., Philadelphia, Pa.
Bick, Hans C., Inc., Reading, Pa.
Magnus Chemical Co., Garwood, N. J.
Miller, R. H., Co., Inc., Homer, N. Y.
Oakite Products, Inc., New York, N. Y.
Potter, Neil C., Newark, N. J.
Standard Industrial Compounds Co., Chicago, Ill.

MACHINERY—Armoring (Cable, Wire Hose)
American Insulating Mach'y. Co., Phila., Pa.
Fidelity Machine Co., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Robertson, John, Co., Brooklyn, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Rahway, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Braiding
Fidelity Machine Co., Philadelphia, Pa.
Mossberg Pressed Steel Corp., Attleboro, Mass.
New England Butt Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Brazing
Syncro Machine Co., Rahway, N. J.

MACHINERY—Bunching
American Insulating Mach'y. Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Rahway, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Bundling, Scrap
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.
Watson Machine Co., Paterson, N. J.

MACHINERY—Cable, Electric
American Insulating Mach'y. Co., Phila., Pa.
Fidelity Machine Co., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Rahway, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Chain Making
Nilson, A. H., Machine Co., The, Bridgeport, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Closing
New England Butt Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Coil Winding
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Rahway, N. J.

MACHINERY—Coilers
Broden Construction Co., Cleveland, Ohio
Eisler Engineering Co., Newark 3, N. J. (for Tungsten Wire)
Morgan Construction Co., Worcester, Mass.
New England Butt Co., Providence, R. I.
Ruesch, H. J., Machine Co., Newark, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Rahway, N. J.
Torrington Mfg. Co., Torrington, Conn.
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Copper Wire Drawing and Rolling
American Insulating Machy. Co., Philadelphia, Pa.
Ruesch, H. J., Machine Co., Newark, N. J.
Syncro Machine Co., Rahway, N. J.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.

MACHINERY—Covering Wire
American Insulating Machy. Co., Philadelphia, Pa.
Fidelity Machine Co., Philadelphia, Pa.
Syncro Machine Co., Rahway, N. J.

MACHINERY—Cutting
Broden Construction Co., Cleveland, Ohio
Eisler Engineering Co., Newark 3, N. J.
Lewis Machine Co., The, Cleveland, Ohio
Moslo Machinery Inc., Cleveland, Ohio.
National Machinery Exchange (Used), New York, N. Y.
Nilson, A. H., Machine Co., The, Bridgeport, Conn.
Porter, H. K., Inc., Everett, Mass.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Rahway, N. J.
Torrington Mfg. Co., Torrington, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Die Making
Firth-Sterling Steel Co., McKeesport, Pa.
Roos, H. & G., Tool & Mfg. Co., Montclair, N. J.

MACHINERY — Die Making for Forming Special Shapes
O'Neil-Irwin Mfg. Co., Minneapolis, Minn.

MACHINERY—Draw Benches
Broden Construction Co., Cleveland, Ohio.
Morgan Construction Co., Worcester, Mass.
Ruesch, H. J., Machine Co., Newark, N. J.
Standard Machinery Co., Providence, R. I.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Edging
Broden Construction Co., Cleveland, Ohio.
Standard Machinery Co., Providence, R. I.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Enameling
American Insulating Mach'y. Co., Phila., Pa.
Syncro Machine Co., Rahway, N. J.

MACHINERY—Extruding
Robertson, John, Co., Brooklyn, N. Y.
Royle, John, & Sons, Paterson, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Filament Coil Winding
Eisler Engineering Co., Newark 3, N. J.

MACHINERY—Flat Wire
Broden Construction Co., Cleveland, Ohio
Ruesch, H. J., Machine Co., Newark, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Forming
Eisler Engineering Co., Newark 3, N. J.
National Machinery Exchange (Used), New York, N. Y.
Nilson, A. H., Machine Co., The, Bridgeport, Conn.
O'Neil-Irwin Mfg. Co., Minneapolis, Minn.
Sleeper & Hartley, Inc., Worcester, Mass.
Standard Machinery Co., Providence, R. I.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Galvanizing
Wilson, Lee, Engr. Co., Cleveland, Ohio

MACHINERY—Galvanizing Wire
Broden Construction Co., Cleveland, O.
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.
Wilson, Lee, Engr. Co., Cleveland, Ohio

MACHINERY—Gang Winders
Fidelity Machine Co., Philadelphia, Pa.
Robinson Mfg. Co., Muncy, Pa.
Ruesch, H. J., Machine Co., Newark, N. J.
Syncro Machine Co., Rahway, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Grinding
Norton Co., Worcester, Mass.

MACHINERY—Insulating
American Insulating Mach'y Co., Phila., Pa.
Fidelity Machine Co., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Royle, John, & Sons, Paterson, N. J.
Syncro Machine Co., Rahway, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Knitting
Fidelity Machine Co., Philadelphia, Pa.

MACHINERY—Lead Encasing Presses, etc.
Robertson, John, Co., Brooklyn, N. Y.

MACHINERY—Lead Stripping
Robertson, John, Co., Brooklyn, N. Y.
Watson Machine Co., Paterson, N. J.

MACHINERY—Lock Washer
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Magnet Wire
American Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Rahway, N. J.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Material Handling
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, Ohio.

WHERE TO BUY, Continued

MACHINERY — Measuring Wire & Cable
Davis, R. L., Electric Co., Wallingford, Conn.
Durant Mfg. Co., Milwaukee, Wis.
Lyon-Vail Machine Co., Brockton, Mass.
New England Butt Co., Providence, R. I.
Syncro Machine Co., Rahway, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Nail and Tack
Broden Construction Co., Cleveland, Ohio.
Glader, Wm., Machine Works, Chicago, Ill.
National Machinery Exchange (Used), New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Panning
American Insulating Mach'y Co., Phila., Pa.
Syncro Machine Co., Rahway, N. J.

MACHINERY—Pointing
Broden Construction Co., Cleveland, Ohio
Morgan Construction Co., Worcester, Mass.
Ruesch, H. J., Machine Co., Newark, N. J.
Scudder, E. J., Fdry. & Mach. Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Standard Machinery Co., Providence, R. I.
Syncro Machine Co., Rahway, N. J.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.

MACHINERY—Quill Winding
Fidelity Machine Co., Philadelphia, Pa.

MACHINERY—Rod Mill
Broden Construction Co., Cleveland, Ohio
Morgan Construction Co., Worcester, Mass.
Ruesch, H. J., Machine Co., Newark, N. J.

MACHINERY—Rolling Mill
Broden Construction Co., Cleveland, Ohio
Morgan Construction Co., Worcester, Mass.
National Machinery Exchange (Used), New York, N. Y.
Ruesch, H. J., Machine Co., Newark, N. J.
Standard Machinery Co., Providence, R. I.
Syncro Machine Co., Rahway, N. J.
Torrington Mfg. Co., Torrington, Conn.
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.

MACHINERY—Rubber for Insulating Wire
Royle, John, & Sons, Paterson, N. J.

MACHINERY—Rubber Strip Covering
New England Butt Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Rubber Tubing and Straining
New England Butt Co., Providence, R. I.
Royle, John, & Sons, Paterson, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Screw Wire
National Machinery Exchange (Used), New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Special
American Insulating Mach'y Co., Phila., Pa.
Broden Construction Co., Cleveland, Ohio
Emory, Robert J., Co., Newark, N. J.
New England Butt Co., Providence, R. I.
Ruesch, H. J., Machine Co., Newark, N. J.
Scudder, E. J., Fdry. & Mach. Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Standard Machinery Co., Providence, R. I. (Special Designs)
Syncro Machine Co., Rahway, N. J.
Torrington Mfg. Co., Torrington, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Spooling
American Insulating Mach'y Co., Phila., Pa.
Eisler Engineering Co., Newark 3, N. J.
Emory, Robert J., Co., Newark, N. J.
Fidelity Machine Co., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Rahway, N. J.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Spring Making
National Machinery Exchange (Used), New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Staple
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Straightening
Broden Construction Co., Cleveland, Ohio
Lewis Machine Co., The, Cleveland, Ohio
Moslo Machinery Co., Cleveland, Ohio
National Machinery Exchange (Used), New York, N. Y.
Nilson, A. H., Machine Co., The, Bridgeport, Conn.
Ruesch, H. J., Machine Co., Newark, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Stranding
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Rahway, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Strip Steel
Broden Construction Co., Cleveland, Ohio
Ruesch, H. J., Machine Co., Newark, N. J.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Swaging
National Machinery Exchange (Used), New York, N. Y.
Ruesch, H. J., Machine Co., Newark, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Standard Machinery Co., Providence, R. I.
Syncro Machine Co., Rahway, N. J.
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.

MACHINERY—Taping
American Insulating Mach'y Co., Phila., Pa.
Fidelity Machine Co., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Syncro Machine Co., Rahway, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Testing
Scott, Henry L., Co., Providence, R. I.

MACHINERY—Testing Size of Wire
Davis, R. L., Electric Co., Wallingford, Conn.

MACHINERY—Testing Spring
Standard Machinery Co., Providence, R. I.

MACHINERY—Tinsel Rolling Mills
American Insulating Mach'y Co., Phila., Pa.
Syncro Machine Co., Rahway, N. J.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Trolley Wire
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Tube Mill
Ruesch, H. J., Machine Co., Newark, N. J.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Welding Wire
Eisler Engineering Co., Newark 3, N. J.
Micro Products Co., Chicago, Ill.
Syncro Machine Co., Rahway, N. J.

MACHINERY—Winding
American Insulating Mach'y Co., Phila., Pa.
Eisler Engineering Co., Newark 3, N. J.
Fidelity Machine Co., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Rahway, N. J.
Torrington Mfg. Co., Torrington, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Wind-up (Constant Tension, Variable Speed)
Industrial Oven Engr. Co., Cleveland, O.

MACHINERY—Wire Bending
Eisler Engineering Co., Newark 3, N. J.
O'Neil-Irwin Mfg. Co., Minneapolis, Minn.

MACHINERY—Wire Drawing
American Insulating Mach'y Co., Phila., Pa.
Broden Construction Co., Cleveland, Ohio
Eisler Engineering Co., Newark 3, N. J.
Morgan Construction Co., Worcester, Mass.
National Machinery Exchange (Used), New York, N. Y.
Ruesch, H. J., Machine Co., Newark, N. J.
Scudder, E. J., Fdry. & Mach. Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Standard Machinery Co., Providence, R. I.
Syncro Machine Co., Rahway, N. J.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.

MACHINERY—Wire Measuring
Durant Mfg. Co., Milwaukee, Wis.
Lyon-Vail Machine Co., Inc., Brockton, Mass.
New England Butt Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Wire Rope
New England Butt Co., Providence, R. I.
Syncro Machine Co., Rahway, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Wire Tinning
American Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Syncro Machine Co., Rahway, N. J.

MACHINERY—Wood Screw
National Machinery Exchange (Used), New York, N. Y.

MATERIAL HANDLING EQUIPMENT
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, O.

MILLS—Tandem Rolling and Edging
Standard Machinery Co., Providence, R. I.
Torrington Mfg. Co., Torrington, Conn.

MOISTURE METERS—
Hart, Raymond S., Jersey City, N. J.

NICKEL SILVER AND PHOSPHOR BRONZE—Rod, Wire and Strip
Hudson Wire Co., Ossining, N. Y.

OILS—Wire Drawing
Apex Alkali Products Co., Philadelphia, Pa.
Miller, R. H., Co., Inc., Homer, N. Y.
Oakite Products, Inc., New York, N. Y.
Shell Oil Co., New York, N. Y.
Standard Industrial Compounds Co., Chicago, Ill.

OVENS—Cable Lacquering
Industrial Oven Engr. Co., Cleveland, Ohio

OVENS—Dehydrogenizing
Industrial Oven Engr. Co., Cleveland, O.

OVENS—Industrial
Carl-Mayer Corp., The, Cleveland, Ohio
Industrial Oven Engr. Co., Cleveland, Ohio
Morrison Engr. Corp., Cleveland, Ohio
Ross, J. O., Engineering Corp., New York, N. Y.

OVENS—Welding Rod Coating
Industrial Oven Engr. Co., Cleveland, O.

PAINTS—Heat Resisting
American Chemical Paint Co., Ambler, Pa.

PAINTS—Marine
American Chemical Paint Co., Ambler, Pa.

PAINTS—Structural Steel
American Chemical Paint Co., Ambler, Pa.

PANS—Lead and Spelter
National Annealing Box Co., Washington, Penna.

PANS—Vulcanizing
Mossberg Pressed Steel Corp., Attleboro, Mass.

PAPER—Creped Wrapping
Crepe-Kraft Co., Newark, N. J.

PAPER TESTERS—
Scott, Henry L., Co., Providence, R. I.

PATENT ATTORNEYS—
Lancaster, Allwine and Rommel, Washington, D. C.

PICKLING COMPOUNDS—
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Oakite Products, Inc., New York, N. Y.
Parkin, Wm. M. Co., Pittsburgh, Pa.

PICKLING TANK LININGS—
Ceilcote Co., The, Cleveland, O.
Keagler Brick Co., Steubenville, Ohio.
Sauereisen Cement Co., Pittsburgh, Pa.

PIPES AND FITTINGS—Acid Resistant
Haveg Corp., Newark, Del.

PLASTIC TESTERS—
Scott, Henry L., Co., Providence, R. I.

PLASTICS—For Insulation
Carbide & Carbon Chemicals Corp., Plastics Div., New York, N. Y.

POTS—Lacquer
Industrial Oven Engr. Co., Cleveland, O.

POTS—Lead Melting
Robertson, John, Co., Brooklyn, N. Y.

POWDER—Wire Drawing
Apex Alkali Products Co., Philadelphia, Pa.

PRESSES—Hydraulic and Mechanical
Robertson, John, Co., Brooklyn, N. Y.
Standard Machinery Co., Providence, R. I. (Mechanical Only)

PRESSES—Lead
Robertson, John, Co., Brooklyn, N. Y.

PRESSURE VESSELS—
National Annealing Box Co., Washington, Penna.

WHERE TO BUY, Continued

PULLERS—Wire
Scudder, E. J., Fdry. & Mach. Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.

PUMPS—Hydraulic
Robertson, John, Co., Brooklyn, N. Y.

QUENCHING BATH CONTROLS—
Niagara Blower Co., Buffalo, N. Y.

REEL AND TENSION STAND—
Fidelity Machine Co., Philadelphia, Pa.
Moslo Machinery Co., Cleveland, Ohio
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Rahway, N. J.

REEL CRUTCHES—
Watson Machine Co., Paterson, N. J.

REELS—Annealing and Stranding
Apco Mossberg Co., Attleboro, Mass.
Hubbard Spool Co., Chicago, Ill.
Moslo Machinery Co., Cleveland, Ohio
Mossberg Pressed Steel Corp., Attleboro, Mass.
Stevens Metal Products Co., Niles, O.

REELS—Steel
Apco Mossberg Co., Attleboro, Mass.
Hubbard Spool Co., Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Stevens Metal Products Co., Niles, O.

REELS AND SPOOLS—Shipping and Shop
Apco Mossberg Co., Attleboro, Mass.
Hubbard Spool Co., Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Stevens Metal Products Co., Niles, O.

REELS—Takeoff
Apco Mossberg Co., Attleboro, Mass.
Hubbard Spool Co., Chicago, Ill.
Moslo Machinery Co., Cleveland, Ohio
Mossberg Pressed Steel Corp., Attleboro, Mass.
Stevens Metal Products Co., Niles, O.

REELS—Vulcanizing and Impregnating
Apco Mossberg Co., Attleboro, Mass.
Hubbard Spool Co., Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Stevens Metal Products Co., Niles, O.

REELS—Wire Drawing
Apco Mossberg Co., Attleboro, Mass.
Hubbard Spool Co., Chicago, Ill.
Moslo Machinery Co., Cleveland, Ohio
Mossberg Pressed Steel Corp., Attleboro, Mass.
Stevens Metal Products Co., Niles, O.

REFRACTORIES—High Temperature
Norton Co., Worcester, Mass.

ROD BAKERS—
Carl-Mayer Corp., The, Cleveland, Ohio
Morrison Engr. Corp., Cleveland, Ohio
Moslo Machinery Co., Cleveland, Ohio
Ross, J. O., Engineering Corp., New York, N. Y.

RODS—Wire—Non-Ferrous
Hudson Wire Co., Ossining, N. Y.
Platt Bros. & Co., The, Waterbury, Conn.

RODS—Wire—Steel
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Indiana.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Keystone Steel & Wire Co., Peoria, Ill.

ROLL STRAIGHTENERS—
Moslo Machinery Co., Cleveland, Ohio

ROPE—Wire
Bethlehem Steel Co., Bethlehem, Pa.
Brewer Mfg. Co., Muncy, Pa.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Wickwire Spencer Steel Co., New York, N. Y.

RUBBER AND RUBBER COMPRESSION TESTERS—
Scott, Henry L., Co., Providence, R. I.

RUST PROOF COMPOUNDS—
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Oakite Products, Inc., New York, N. Y.

RUST REMOVING COMPOUNDS—
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Oakite Products, Inc., New York, N. Y.

SATURATION SYSTEMS—
Industrial Oven Engr. Co., Cleveland, O.

SHEARS—
O'Neil-Irwin Mfg. Co., Minneapolis, Minn.

SHEET—Steel
Continental Steel Corp., Kokomo, Ind.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.

SOAPS—Industrial and Wire Drawing
Apex Alkali Products Co., Philadelphia, Pa.
Magnus Chemical Co., Garwood, N. J.
Miller, R. H., Co., Inc., Homer, N. Y.
Potter, Neil C., Newark, N. J.
Standard Industrial Compounds Co., Chicago, Ill.

SOLVENT RESIN SYSTEMS—Experimental
Industrial Oven Engr. Co., Cleveland, O.

SPOOLS—Annealing and Wire Drawing
Apco Mossberg Co., Attleboro, Mass.
Hubbard Spool Co., Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Stevens Metal Products Co., Niles, O.

SPOOLS—Shipping and Shop
Apco Mossberg Co., Attleboro, Mass.
Hubbard Spool Co., Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Stevens Metal Products Co., Niles, O.

SPOOLS—Steel
Apco Mossberg Co., Attleboro, Mass.
Hubbard Spool Co., Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Stevens Metal Products Co., Niles, O.

SPRINGS—Steel
Wickwire Spencer Steel Co., New York, N. Y.

STAMPINGS—Steel
Hubbard Spool Co., Chicago, Ill
Mossberg Pressed Steel Corp., Attleboro, Mass.

STRAND—Steel and Copper
Brewer Mfg. Co., Muncy, Pa.

STRIP—Brass and Non-Ferrous
Hudson Wire Co., Ossining, N. Y.

STRIP—Steel
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Firth-Sterling Steel Co., McKeesport, Pa.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.

STRIP METAL TESTERS—
Scott, Henry L., Co., Providence, R. I.

SWIFTS—Take-off
Apco Mossberg Co., Attleboro, Mass.
Mossberg Pressed Steel Corp., Attleboro, Mass.

TANK LININGS—Brick
Ceilcote Co., The, Cleveland, O.
Keagler Brick Co., Steubenville, Ohio.
Nukem Products Corp., Buffalo, N. Y.

TANKS—Compound
Watson Machine Co., Paterson, N. J.

TANKS—Pickling
Haveg Corp., Newark, Del.
Heil Engineering Co., Cleveland, Ohio.
Nukem Products Corp., Buffalo, N. Y.
Sauereisen Cements Co., Pittsburgh, Pa.

TANKS—Steel
Mossberg Pressed Steel Corp., Attleboro, Mass.

TEMPERATURE CONTROLS—
Niagara Blower Co., Buffalo, N. Y.

TENSILE TESTERS—
Scott, Henry L., Co., Providence, R. I.

TESTING INSTRUMENTS—
Scott, Henry L., Co., Providence, R. I.

TOOLS—Wire Cutting
Porter, H. K., Inc., Everett, Mass.

TRAMRAIL SYSTEMS—
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, O.

TREADS—Safety
Norton Co., Worcester, Mass.

TRUCKS—
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

TUBE BENDERS AND FORMERS—
Ruesch, H. J., Machine Co., Newark, N. J.

TURKS HEADS—Friction and Power Driven
Standard Machinery Co., Providence, R. I.

VALVES AND FITTINGS—Acid Resistant
Haveg Corp., Newark, Del.

VULCANIZERS—
Watson Machine Co., Paterson, N. J.

VULCANIZING PANS—
American Insulating Mach'y Co., Phila., Pa.
Mossberg Pressed Steel Corp., Attleboro, Mass.

WELDERS—Spot and Butt
Eisler Engineering Co., Newark 3, N. J.
Micro Products Co., Chicago, Ill.
Moslo Machinery Co., Cleveland, Ohio

WIND-UP AND UNWIND SYSTEMS—Continuous
Industrial Oven Engr. Co., Cleveland, O.

WIRE—Cold Heading
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Indiana.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Keystone Steel & Wire Co., Peoria, Ill.
Pittsburgh Steel Co., Pittsburgh, Pa.

WIRE—Electric
Hudson Wire Co., Ossining, N. Y.

WIRE—Enameled for Coils
Winsted Div. of Hudson Wire Co., Winsted, Conn.

WIRE—Flat
Pittsburgh Steel Co., Pittsburgh, Pa.

WIRE—Galvanized
Pittsburgh Steel Co., Pittsburgh, Pa.

WIRE—Manufacturers
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Firth-Sterling Steel Co., McKeesport, Pa.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Keystone Steel & Wire Co., Peoria, Ill.
Pittsburgh Steel Co., Pittsburgh, Pa.
Wickwire Spencer Steel Co., New York, N. Y.

WIRE—Music
Jersey Steel & Wire Corp., Irvington, N. J.

WIRE—Nickel Silver and Phosphor Bronze
Callite Tungsten Corp., Union City, N. J.
Hudson Wire Co., Ossining, N. Y.

WIRE—Non-Ferrous to Specification for Special Purposes
Callite Tungsten Corp., Union City, N. J.
Hudson Wire Co., Ossining, N. Y.
Winsted Div. of Hudson Wire Co., Winsted, Conn.

WIRE—Spring
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Firth-Sterling Steel Co., McKeesport, Pa.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Keystone Steel & Wire Co., Peoria, Ill.
Pittsburgh Steel Co., Pittsburgh, Pa.
Wickwire Spencer Steel Co., New York, N. Y.

WIRE—Stainless Steel
Callite Tungsten Corp., Union City, N. J.
Firth-Sterling Steel Co., McKeesport, Pa.
Jersey Steel & Wire Corp., Irvington 11, N. J.
Pittsburgh Steel Co., Pittsburgh, Pa.

WIRE—Steel—Also Coppered Steel—Also Galvanized Steel
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Keystone Steel & Wire Co., Peoria, Ill.
Wickwire Spencer Steel Co., New York, N. Y.

WIRE AND STRIP—Zinc
Platt Bros. & Co., The, Waterbury, Conn.

WIRE TESTERS—
Scott, Henry L., Co., Providence, R. I.

WIRE, WEAVING—Non-Ferrous
Hudson Wire Co., Ossining, N. Y.

WRAPPING PAPER—Creped
Crepe-Kraft Co., Newark, N. J.

YARN TESTERS—
Scott, Henry L., Co., Providence, R. I.

YARNS—Insulating
Cheney Bros., New York, N. Y.

HUDSON WIRE COMPANY

PRODUCERS OF FINE WIRES IN ALL METALS

FINE BARE WIRES

High Brass, Low Brass, Zinc 99.99+ and High Tensile Zinc, Commercial Bronze, Phosphor Bronze, Pure Tin, Lead, Antimonial Lead, Tinsel Lahns, Silver Plated Copper, False Gold and Copper.

Cadmium, Nickel Silver, 10%, 18% and 30%; Silver Plated Copper, False Gold and Special Brass and Bronze Alloys to Specification, Metallic Fibre for Packing Purposes, Copper, Bronze, Zinc, Lead and Aluminum.

WIRES FOR METAL SPRAYING

Pure Lead, Lead Alloy, Pure Zinc, Zinc Alloy, Copper, Tin, High Brass, Low Brass, Solder Wire, High Conductivity, Electric Wire.

Cadmium, Nickle Silver, (10%, 18%, 30%); Aluminum, Monel Metal, Phosphor Bronze, Pure Nickel, Commercial Bronze.

Look for the name — **HUDCO** — A guarantee of quality

"HUDCO" specially processed Copper Wire for enamelling purposes is drawn from Selected Copper, insuring the maximum conductivity. This is but one example of the use of the most advanced and approved materials and methods in our processing.

BETTER WIRE AT LOWER COST

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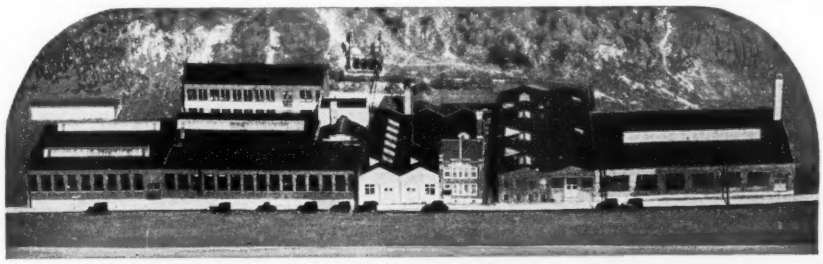


"HUDCO" PLANT AT OSSINING, NEW YORK

HUDSON WIRE COMPANY

Established in 1902 — Successors to Royle & Akin

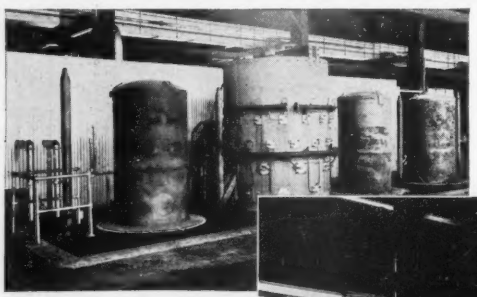
OSSINING, NEW YORK

EF FURNACES

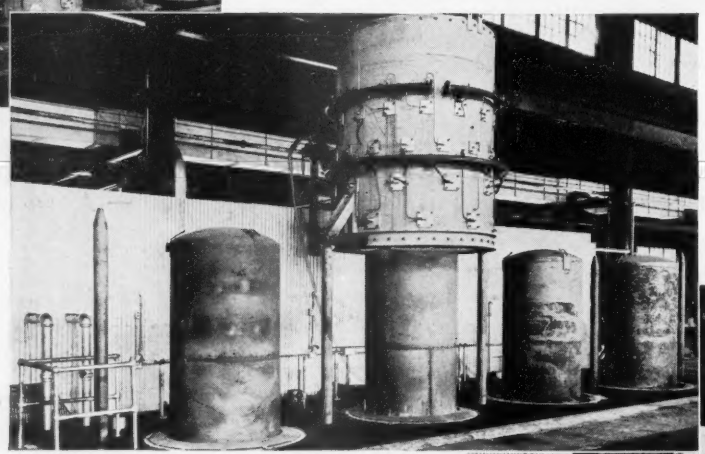
For Every Industrial Heat Treating Process

These EF Gas Fired Bell Type Furnaces

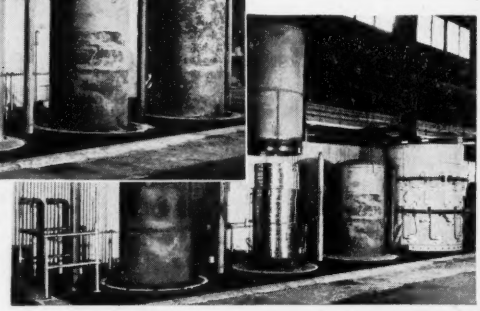
Maintain Uniform Temperature Throughout Charge Regardless of the Weight, Size or Height of Load



(Above) An EF Bell Type Installation consisting of furnace, 4 bases, and retorts.



(Left) Each base accommodates charges up to 22,000 lbs. and coils up to 45" in diameter.



(Right) Removing a retort from base, showing bright annealed charge.

For Annealing Strip, Wire and Other Products

Equipped with special radiant type gas burners and separate automatic temperature control zones, these EF gas fired removable hood type furnaces obtain and maintain uniform temperature distribution throughout the entire charge on each and every load, regardless of weight, size or height of load.

The installation shown above was designed for annealing medium and high carbon mirror-finish cold rolled steel strip, and is equipped with special EF gas generator equipment for producing the protective atmosphere for bright annealing without decarburization. Each base accommodates charges up to 22,000 lbs. and handles coils in any width and up to 45" in diameter.

This installation is equipped with a pre-mix plant for mixing the gas and air in proper proportions. This eliminates all manual burner adjustments, as the gas-air mixture is previously obtained in the machine. The high turn down ratio on burners permits use of modulating type control.

This equipment is provided with 4 bases, each with motor driven centrifugal type fan for circulating atmosphere down through the center of the charge and up between the outside of coil and the gas-tight retorts.

An extremely high rate of circulation is obtained and uniform temperature is provided and maintained regardless of the size of charge.

Other types of outstanding EF production furnace installations include furnaces for bright annealing both ferrous and non-ferrous strip, wire, tubing and other products . . . furnaces for the production heat treatment of tank armor castings, cartridge cases, shell forgings, bomb and gun parts, machine gun cartridge clips, aircraft and aircraft engine parts, aluminum and magnesium castings, bolts, springs, and many other allied products.

Telephone 4661 Salem, Ohio, or write us regarding your furnace requirements. We specialize on building production furnaces—oil fired, gas fired, or electrically heated.

The Electric Furnace Co., Salem, Ohio

Gas Fired, Oil Fired and Electric Furnaces---For Any Process, Product or Production